

Rural America

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This issue of *Rural America* covers a wide spectrum of topics. The recent power crisis in California has drawn attention to the electric utility industry and efforts over the past few years to deregulate it. Constance Newman's article examines the changing regulatory environment and its likely impact on rural America. Deregulation has brought consolidation among investor-owned utilities and instances where wholesale electricity prices have soared. Many rural counties—and 11 percent of the U.S. population—are served by rural electric cooperatives, which were created in the 1930s to provide power for the scattered population overlooked by investor-owned utilities. Deregulation has been slowest in States where cooperatives are most important. Cooperatives have higher costs and may be at a disadvantage unless steps are taken to ensure that electric markets remain open and nondiscriminatory.

China is a country undergoing a rural-to-urban transition not unlike the United States did during the 20th century, but on a much larger scale. Fred Gale and Hongguo Dai analyze China's rural development efforts and their potential effects on the United States. To raise rural incomes and productivity, China will need to find other work for some 200 million farm workers. The government has encouraged the formation of new towns in the countryside to avoid a massive urban influx, but it remains uncertain whether it will be able to create enough of the right kinds of jobs or whether it can afford the huge infrastructure investments required. Successful new industries in China might compete with rural American industries, but the new towns might also become customers for American products and services.

In recent years, foreign immigration to rural areas in the United States has revived. Whereas 19th-century immigration often brought large groups of European immigrants to new settlements where they could easily maintain their separate identities, the new wave of predominantly Hispanic immigration to long-settled towns is throwing together new and old residents of different ethnic backgrounds. Rochelle L. Dalla, Sheran Cramer, and Kaye Stanek study the effects of this immigration on three Nebraska meatpacking towns, surveying new and old residents. New immigrants experienced greater economic stress and poorer nutrition than long-term residents, but both groups shared perceptions that might unite them.

USDA annual estimates of the cost of rearing children are widely used in setting child support and foster care payments, in educational programs for prospective parents, and in certain court cases. Mark Lino provides estimates of both rural and urban expenses for 2000. Rural families typically spend several hundred dollars less each year per child. Urban families spend a relatively large portion on housing, while rural families devote a higher proportion to transportation. For rural families since 1960, housing, food, and clothing costs have accounted for a smaller proportion of total expenditures, while child care/education and health care have shown significant increases.

The economy's long expansion ended in 2001, although recovery began in the winter of 2002. David A. Torgerson and Karen S. Hamrick provide an update of recent economic developments and their implications for rural areas. The end of the technology boom, lower manufacturing activity, and the strong dollar triggered the start of recession, which was worsened by world events in the fall of 2001. Nonmetro areas were particularly affected by the manufacturing slowdown and the loss of exports. Regions such as the Southeast, Pacific Northwest, and North Atlantic have been especially hard hit by layoffs.

Reflecting the weaker economy, rural America ended its long period of growth in 2001 and unemployment began to rise. Lorin Kusmin reports that rural employment turned negative in the 2nd quarter of 2001 and unemployment has been rising since 2000. Metro trends have been similar, although in recent years metro employment growth has been faster and unemployment lower.

William Edmondson updates data relating to the food and fiber system and food and agricultural trade. The food and fiber system accounted for 17.1 percent of total employment and 12.8 percent of the GDP in 2000. Although these percentages have declined somewhat over the past decade, the food and fiber system added a record \$1.3 trillion to the GDP in 2000. Economic activity generated by agricultural exports grew to \$127.3 billion in 2000, aided by rising exports. New this year are estimates for food trade, which exclude nonfood agricultural exports such as cotton and tobacco but include fish products and distilled spirits, which are not counted as agricultural. Food exports generated \$116 billion in economic activity in 2000. Each dollar of both agricultural and food exports resulted in additional economic activity of more than \$1.45.

Douglas E. Bowers

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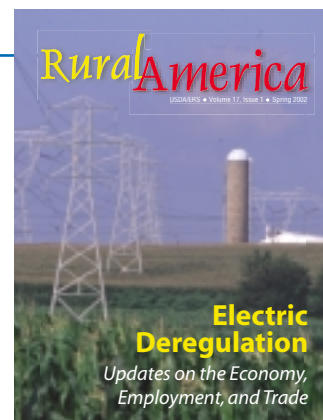
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On the cover:
Electric power lines over corn fields.
Photo courtesy Grant Heilman Photography, Inc.



**Electric
Deregulation**
*Updates on the Economy,
Employment, and Trade*

Electric Market Restructuring Issues for Rural America

Constance Newman

Rural America currently enjoys high-quality electric service, and the continued provision of that service will be essential to rural economic development efforts. Yet the enormous changes underway in the electric industry may complicate those efforts by making rural electricity provision more expensive or less reliable. One of the most promising development proposals for rural areas has been the expansion of computer and internet-based services, but this path is highly dependent on electricity. Other rural development approaches—like tourism, value-added service manufacturing, and small-scale energy production—must also anticipate the impact of changes in the electric industry on rural customers.

California's recent effort to deregulate the industry and the crisis that ensued has led to more careful consideration of market design. What was once considered a simple path to improving efficiency in the industry is now evident as a complex restructuring of institutions and markets. The Bush administration and Congress are

Deregulation can create new opportunities for rural America, but it may also introduce new costs. Rural areas are susceptible to changes in the industry that increase electricity costs because such areas are already expensive to serve, and the cooperatives that serve them tend to be small. This article discusses four electricity deregulation issues of importance to rural areas: transmission pricing and investment, retail competition, market power and mergers, and distributed generation.

pursuing legislation to address the structural defects revealed by the California experience, but stakeholders agree that the new legislation must be based on a more thorough understanding of electricity markets.

How deregulation might affect rural areas is especially relevant in the wake of the California debacle. Historically, rural areas have struggled with electricity markets. Rural America was severely underserved at the beginning of the century when the industry was completely private. Only 10 percent of rural households had electricity by 1930, while 90 percent of urban households did. Rural households had better access to telephones and automobiles than electricity.

It was not until the mid-1930s, with technical and financial assistance from the Federal Government, that rural areas were able to connect to the electric power grid. Cooperatives emerged as the main providers of rural electricity after government overtures to private investors failed. Private utilities

claimed that rural residents were too dispersed and too poor to afford electricity and that it would not be profitable to serve them. But the cooperatives were able to provide electricity at a lower cost than the private utilities had estimated. Ironically, once the cooperatives became successful, the private utilities often challenged them in court and tried to steal their customers by building lines through the cooperatives' service territories.

Once started, rural electrification took off rapidly. Rural households bought electric appliances of all kinds due to electricity's many applications on the farm and the promotion of appliances by the Rural Electrification Administration. Today, rural consumers still depend heavily on electricity. As a percentage of a household's total energy budget, rural households spend 72 percent on electricity while urban households spend 65 percent, according to the Department of Energy's 1997 Residential Energy Consumption Survey.

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As electricity deregulation progresses, will rural areas continue to receive the high-quality and affordable electric service that they are accustomed to? That will likely depend on how four issues are handled: (1) transmission, (2) retail competition, (3) mergers and market power, and (4) distributed generation.

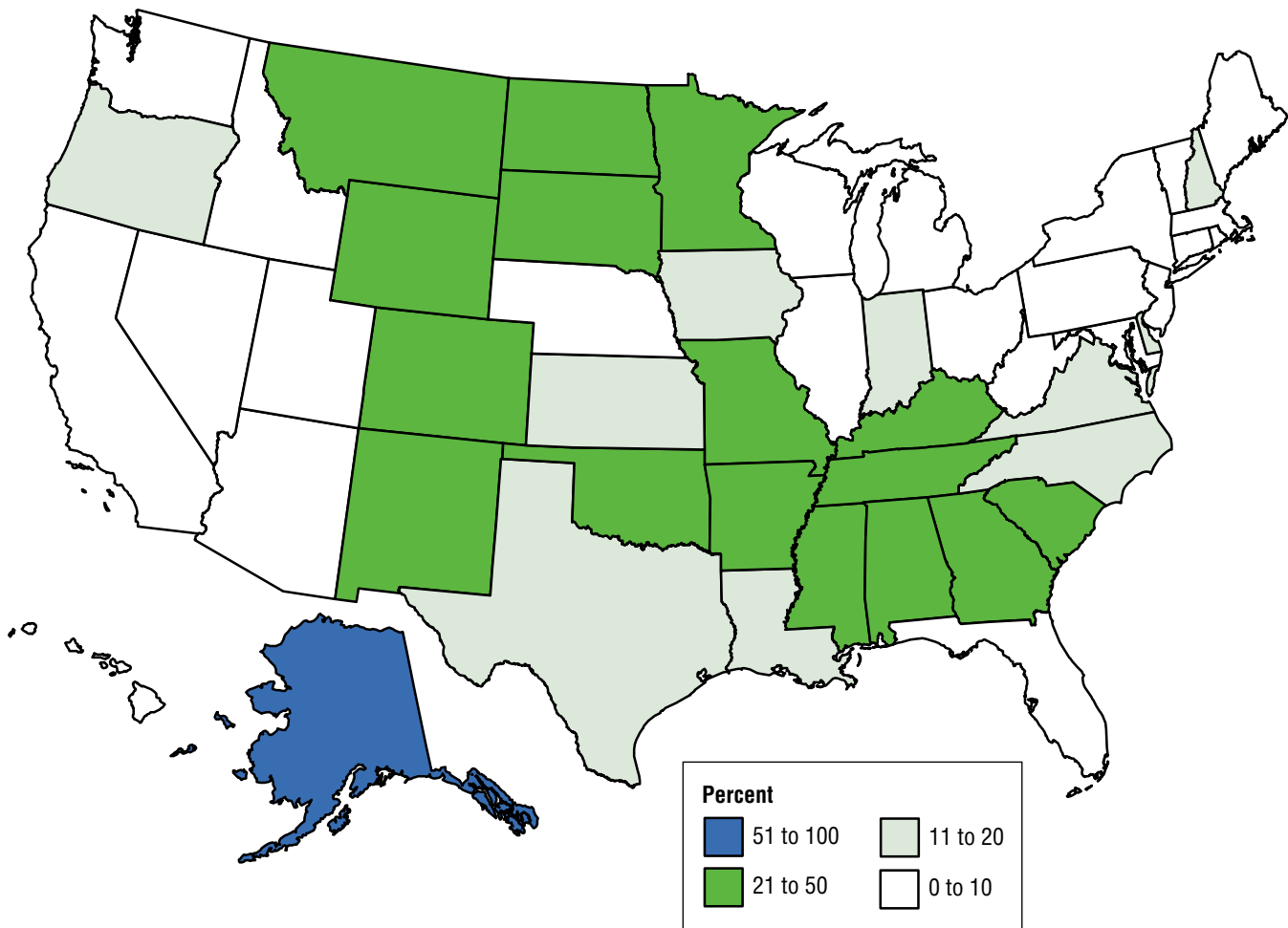
Characteristics of Rural Electric Cooperatives

Rural electric cooperatives serve over 34 million customers in 46 States, or about 11 percent of the current U.S. population. Individual cooperatives tend to be small enterprises averaging fewer than 60 employees and 10,000 customers. In comparison, the typical investor-owned utility (IOU) has over 2,200 employees and 315,000 customers. Despite their small size, however, cooperatives cover 75 per-

cent of the country's total land mass and operate 2.3 million miles, or 44 percent, of the country's distribution lines.

Nationally, there are 865 distribution cooperatives and 60 generation-and-transmission cooperatives, or G&Ts for short. The G&Ts are obligated to serve the distribution cooperatives and only occasionally have excess electricity to sell on the open market. The G&Ts generate about half of their supply from their own plants, and the other half

Figure 1
Rural electric cooperatives by State
The South and Midwest have the highest percentages of co-op customers among State customers



Source: National Rural Electric Cooperative Association.

Table 1

Rural electric cooperatives and deregulation status by State*The South and Midwest, with higher percentages of co-ops, are less likely to have passed deregulation legislation*

State	Number of co-ops	Total customers (all utilities)	Cooperative customers	Co-op percent of total	Deregulation passed	Reversal or slowing of deregulation
Connecticut	0	1,503,282	0	0.0	yes	
District of Columbia	0	219,923	0	0.0	yes	
Hawaii	0	421,581	0	0.0		
Massachusetts	0	2,827,093	0	0.0	yes	
Rhode Island	0	467,794	0	0.0	yes	
California	3	12,899,380	13,487	0.1	yes	suspended
New York	4	7,499,171	15,845	0.2	yes	
New Jersey	1	3,605,476	10,371	0.3	yes	
West Virginia	1	943,913	8,653	0.9	yes	delayed
Maine	3	723,516	13,979	1.9	yes	
Nebraska*	3	885,715	20,701	2.3		
Nevada	3	870,800	26,735	3.1	yes	delayed
Utah	4	833,806	29,361	3.5		
Pennsylvania	13	5,104,483	198,233	3.9	yes	
Illinois	25	5,139,907	249,301	4.9	yes	
Washington	8	2,707,232	140,643	5.2		
Michigan	9	4,534,231	251,877	5.6	yes	
Arizona	6	2,121,707	131,782	6.2	yes	
Ohio	24	5,197,242	327,820	6.3	yes	
Wisconsin	24	2,571,264	185,273	7.2		
Maryland	2	2,174,889	157,223	7.2	yes	
Vermont	2	322,197	24,395	7.6		
Florida	15	7,961,361	788,233	9.9		
Idaho	11	617,058	62,348	10.1		
Oregon	16	1,635,114	172,242	10.5	yes	delayed
New Hampshire	1	623,962	70,311	11.3	yes	
Virginia	12	3,062,559	364,649	11.9	yes	
Iowa	37	1,416,687	192,165	13.6		
Kansas	29	1,330,034	194,634	14.6		
Delaware	1	370,500	56,844	15.3	yes	
Texas	66	9,032,925	1,395,908	15.5	yes	
Indiana	39	2,816,941	451,828	16.0		
Louisiana	11	2,041,874	329,584	16.1		
North Carolina	27	4,006,103	806,768	20.1		
Colorado	22	2,047,712	428,385	20.9		
Alabama	22	2,224,999	468,925	21.1		
New Mexico	16	826,832	174,923	21.2	yes	delayed
Missouri	40	2,736,945	611,639	22.3		
Oklahoma	26	1,729,389	405,863	23.5	yes	delayed
Minnesota	43	2,275,795	610,099	26.8		
Wyoming	11	271,125	75,246	27.8		
South Carolina	20	2,012,085	567,370	28.2		
Tennessee	21	2,747,901	775,877	28.2		
Arkansas	17	1,339,280	385,948	28.8	yes	delayed
Montana	24	480,628	143,969	30.0	yes	delayed
South Dakota	28	379,689	122,488	32.3		
Kentucky	24	1,991,347	680,009	34.1		
North Dakota	18	341,197	118,892	34.8		
Georgia	42	3,732,145	1,429,267	38.3		
Mississippi	25	1,345,963	633,720	47.1		
Alaska	15	269,831	190,799	70.7		
TOTAL	814	125,242,583	14,514,972	11.6		

Source: National Rural Electric Cooperative Association.

*In Nebraska, all consumers are served by nonprofit entities: consumer-owned municipal systems, public power districts, and rural cooperatives.

they buy from Federal power marketers at "preference" (lower) rates. Overall, the G&Ts fulfill about 55 percent of the distribution cooperatives' needs. The distribution cooperatives purchase the rest of their needs from private sources via long-term contracts and on the spot market.

Cooperatives are spread throughout the country, but are especially prevalent in the Midwest and the South (table 1 and fig. 1). The average share of customers served by cooperatives in a State is 11.6 percent. In all States except for Alaska, cooperatives serve less than half of the population. States with higher percentages of customers served by rural electric cooperatives are less likely to have undergone much deregulation (fig. 2). Cooperatives have had less exposure to changes resulting from deregulation.

Cooperatives have lower profits, on average, than other utilities. They have substantially fewer customers per mile served and lower revenues per mile than either IOUs or municipal utilities (table 2). Cooperatives earn 13 percent of what IOUs earn per mile and 11 percent of what municipals earn. In addition to having the highest percentage of rural customers, cooperatives have the highest percentage of residential customers (58 percent). Significantly, cooperatives have the lowest percentage of industrial customers, who enable a utility to better manage demand since an industry can alter its demand more easily and consume electricity during off-peak hours. As a consequence, cooperatives must maintain more excess capacity than IOUs in order to meet the more inelastic peak demand of their customers. This adds to costs

Table 2

Customers and revenues by utility type

Cooperatives have fewer customers and lower revenues per mile than other utilities

	Customers per mile	Revenues per mile	Residential customers	Industrial customers
	<i>Number</i>	<i>Dollars</i>	<i>Percent</i>	<i>Percent</i>
Cooperatives	6	7,900	58	21
Investor-owned utilities	33	61,000	33	33
Municipal utilities	43	71,000	35	29

Source: National Rural Electric Cooperative Association.

and further erodes profits relative to other utilities.

Unlike investor-owned utilities, which act as profit-maximizers, cooperatives are cost-minimizers. They are private entities, incorporated under State law with the mission to provide least-cost electricity service to their customer-owners. Because the cooperatives are cost-minimizers, market rules and regulations can have different implications for cooperative customers than for IOU customers. For example, if a market rule stipulates that utilities must engage in a costly activity, the cost of which they cannot pass on to their customers, the bills of IOU customers are left unchanged. A cooperative has to pass on the cost to customers since the owners of the business are the customers themselves. Thus, if such a rule is instituted with the goal of protecting consumers, it will only protect IOU customers and put the cooperatives at a relative disadvantage in terms of customer service.

Changes in the Industry

The electric utility industry is in a period of exponential change. In a few years, the way electricity is supplied, marketed, delivered, and consumed will be quite different from the standard model of the regulated vertical monopoly. The

impetus for structural change came with the Public Utility Regulatory Policies Act of 1978 (PURPA). PURPA was designed primarily to encourage the use of renewable energy for electricity production, but by doing so, it also showed that small-scale generation facilities could be cheaper and more efficient than the traditional large-scale plants. This, together with favorable reviews of electricity deregulation in the United Kingdom, led many to conclude that generation should be treated as a competitive market rather than as part of a regulated monopoly.

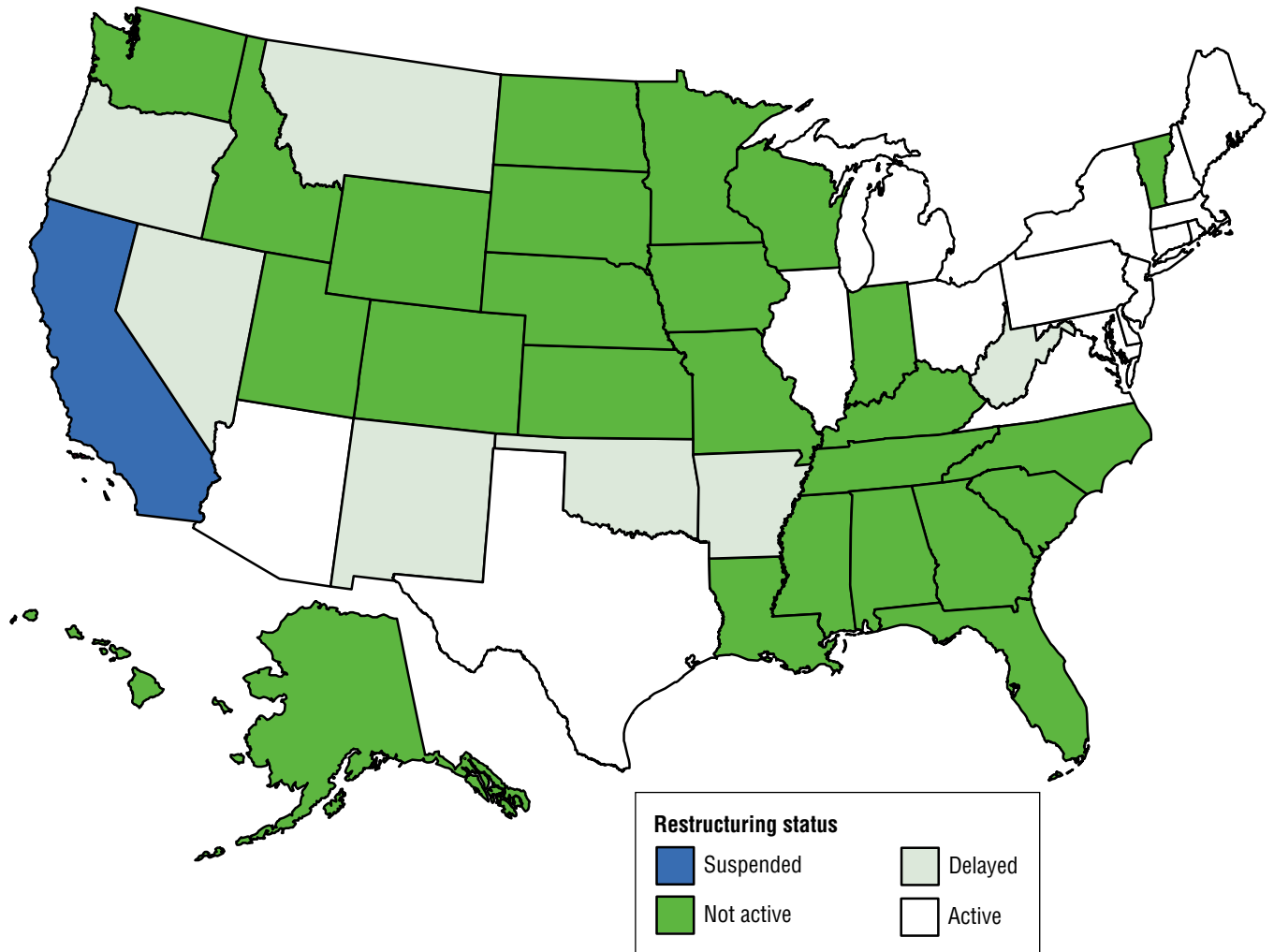
Industrial customers also spurred the movement towards deregulation. Before they deregulated, California and the Northeast had the highest energy rates nationwide, mostly because of the industry's large investments in nuclear facilities, but also due to investments in energy efficiency and low-income programs. Industrial customers threatened to leave these States if nothing was done to reduce rates.

At the national level, the Federal Energy Regulatory Commission (FERC) has been introducing rule changes since the mid-1980s to promote competitive wholesale markets. With these changes, the industry has already been moving toward the separation

Figure 2

Deregulation status by State

The Midwest and the South are less likely to have enacted deregulation legislation



Note: "Active" means the State has either enacted enabling legislation or issued a regulatory order to implement some form of retail competition. Some States are still in the preparatory phases of implementation. "Delayed" means that the State has enacted legislation or issued regulatory orders to delay implementing retail competition. "Suspended" means that the State has suspended its retail competition plan. "Not active" means that the State has not enacted legislation to restructure the electric industry or implement retail competition.

Source: Prepared by the Energy Information Administration, 2001.

of transmission and generation. One of the new rules stipulated that transmission line owners must let other parties use their lines for a standard fee. This was designed to encourage more efficient trading of energy, but there were many ways utilities could still hamper other providers. To counter this, the FERC recently told all utilities to join four Regional Transmission

Organizations (RTOs) that would act as independent managers of regional transmission. This policy met with strong opposition from many parties, such as State regulators who are unconvinced of the benefits of RTOs in the first place and firms already committed to different RTO configurations. The FERC has pledged to consult widely on the design of the RTOs, but they are

committed to establishing them despite lingering concerns in the industry.

Electric deregulation became a household term when problems hit in California. As one of the first States to deregulate, California had instituted a gradual process of allowing the IOUs to charge market prices to retail customers. In the summer of 2000, wholesale prices

skyrocketed. San Diego Gas & Electric was the only IOU able to raise retail prices because they had paid off their debt. In an ironic twist, the California IOUs had negotiated—as their condition for accepting deregulation—a higher retail rate than what they had charged before. The higher rate was justified by the IOUs as necessary to pay off "stranded" debt that the IOUs had incurred and that they were afraid would put them at a competitive disadvantage with other firms in a newly unregulated market. This price cap ended up as a price ceiling instead of a price floor as intended. San Diego Gas & Electric did not have as much stranded debt as the other two much larger IOUs, so once they paid off their debt they were no longer restricted by the retail price cap and could charge market prices. They charged customers five times the usual rate. Within a month, and after significant cost to the San Diego economy, the California Assembly intervened and passed retroactive retail price freezes.

The situation in California had begun as a true energy supply shortage, but because the deregulation design ignored the possibility of shortage and high prices, the situation spiraled into a complex crisis. Since all of the electricity that could be supplied was being consumed and demand was virtually unresponsive to price change, generators could increase the wholesale market price by withholding supply. Another important factor was that prices for natural gas, a critical input in California's electricity generation, had also hit record levels. The pricing behavior of generators, however, was a factor that the State of California thought should be deterred through regula-

tory action. The California Public Utility Commission and the Governor asked the FERC to intervene by imposing wholesale price caps and issuing orders to generators to refund what the State called excess profits. Despite the FERC's own assessment that generation firms had manipulated market prices, the FERC declined to take action.

Wholesale prices fell in October 2000, only to soar again in November and December. In mid-December, utilities were paying \$400/Mwh for power and selling for \$65/Mwh—due to price caps on distributors but not generators. The State refused to issue retail price hikes that the IOUs said were necessary for them to stay in business, and by January 2001, the IOUs stopped paying their past-due invoices. The State of California stepped into the unprecedented role of purchasing power for the IOUs in late January 2001. The State spent roughly \$10 billion on energy purchases between January and August 2001, and raised rates to all customers, by much more than originally requested by the IOUs.

States throughout the West were affected by the crisis, especially the high-consumption States in the Northwest. The Northwest also experienced a shortage of supply because of a drought, and their utilities were forced to pay the same prevailing, inflated wholesale prices. Since most of the Western States had not deregulated their markets, the utilities were able to pass on the higher costs to consumers with rate hikes ranging from 20 to 50 percent. But still the Northwest utilities went heavily into debt, and many businesses closed down.

The FERC changed its course in the summer of 2001, largely as a result of the addition of two new commissioners who formed a new majority opinion on the Commission. The FERC instituted a wholesale price cap and started a process for negotiating refunds. The change in policy, along with lowered demand and a stable supply of energy, led to a subsequent and sustained fall in wholesale prices. The crisis was over by mid-summer 2001, but electricity provision in California will continue to be expensive and the responsibility of the State for many years to come. Other States saw the problems and the lack of cooperation between the Western State officials and Federal agencies as a signal to stop or postpone their own deregulation plans.

Transmission Issues

The electric transmission system in the United States today has been compared to the patchwork of roads that existed before the interstate highway system was built. Historically, utilities formed connections to neighboring utilities as a way to help each other manage loads in special times of imbalance. The North American Electric Reliability Council (NERC) was formed in the mid-1960s by electricity providers after a blackout reverberated along the East Coast and showed how critical it was for the utilities to work together. NERC established guidelines for all utilities in managing their parts of the interconnected national grid, and the rules were enforced through reciprocity and mutual self-interest. But according to a spokesman for NERC, the grid was not designed to work in a competitive environment, nor to handle the large flows of



Photo courtesy PhotoDisc.

electricity that competition engenders.

With deregulated wholesale markets, more transactions occur over longer distances, and fewer entities have direct responsibility for maintaining reliability, according to NERC. As a result, the system is increasingly vulnerable to blackouts and service interruption. The rate mechanisms no longer cover the extra costs associated with running the grid at such levels, and some entities are able to profit from bending the rules. Most analysts agree that the voluntary approach is no longer viable and that the NERC rules should be enforceable either by NERC itself or by giving those powers to another agency, such as the FERC.

There is less consensus on how to price the use of transmission lines. The FERC holds that pricing must be based on an efficient market mechanism that reflects use and rewards investment appropriately. However, because of the way transmission works and the fact that property rights on the lines are not well defined, there is no one "best" price. Electricity flows along all open paths to get to a final destination, rather than along a specified contract path. This makes even the standard cost-of-service-

based rate impossible to correctly identify. Economists have recommended various pricing mechanisms that are designed to increase with congestion and thereby indicate which lines are in need of expansion. There is disagreement, however, among economists on which of these pricing mechanisms is best.

Advocates for rural electric cooperatives, consumers, and public power entities prefer a fixed-fee pricing approach, that is independent of congestion, with investments in the grid to be decided by an independent agency and funded by the Federal Government. They argue that the grid is more like a public highway and that access to it should be open and not determined by willingness to pay as is the case with incentive pricing mechanisms

designed by economists. Also, advocates say that if the transmission lines are already paid for, the real cost of using the lines is close to zero. Higher transmission prices discourage competition in generation because the relevant market size is smaller; customers have fewer options and are more captive to local generators. Leading economists in the field, such as Paul Joskow of MIT and James Bushnell at the University of California Energy Institute, are beginning to address these issues.

Retail Competition

Despite some of the impressions given by the California crisis, no State has completely deregulated prices at the retail level. Most have laws that stipulate a slow introduction of competition in retail markets, but all offer regulated retail prices as at least an option to consumers for a period of transition, or even indefinitely. Nor have any States taken steps to introduce "real-time metering," which would allow all customers to adjust their demand to real prices. A true demand response is a critically important missing element in deregulation plans today, but other problems complicate the implementation of full competition.

Deregulation was universally expected to lead to lower retail

Table 3

Pennsylvania customers with alternative supply and changes over time *Commercial/industrial customers have dropped precipitously*

	April 2000	October 2000	July 2001
Residential	429,670	459,029	574,661*
Commercial	101,153	89,534	16,479
Industrial	4,622	3,103	456

*Includes 16.4% or 223,747 residential customers who participated in the Competitive Discount Service. Under deregulation, PECO agreed to randomly select 20% of its customers to receive electricity from an alternate supplier.

Source: Pennsylvania Office of Consumer Advocate.

prices. But over the last year, while regulated rates stayed constant or even dropped, high wholesale electricity prices discouraged the entrance of competitive suppliers in deregulated States. In Pennsylvania, which is widely thought to have the most successful deregulation plan, there were 52 "alternative" suppliers in October 2000. (Alternative suppliers are providers other than a customer's historical provider.) As of August 2001, there were less than 10. Since then, alternative suppliers have been serving only the more populated urban areas, and rural areas have been left with no alternatives, despite the fact that cooperatives made extensive system upgrades to accommodate competitors. Table 3 shows the decline in the number of Pennsylvania customers signed up with alternative suppliers since April 2000, a couple months after full competitive access had been allowed. The decline is quite rapid for industrial and commercial customers.

The withdrawal of alternative suppliers from the market in Pennsylvania may be temporary, but it illustrates the tension between being able to guarantee service and the needs of a market where no such protections are in place. Alternative suppliers are not required to serve all customers under any State's deregulation law, but the distributing utilities are required to serve as the "provider of last resort." This means that they have to have the capacity to serve many more than they may actually be serving at any point in time. Some State programs have allowed the utilities to restrict the number of times a customer can return to their default provider. And in some States, the requirement that the utility provide default service

expires at the end of the transition period, generally 1 to 3 years.

The contradictions between the needs of the competitive suppliers and the goal of universal service are especially relevant to rural electric cooperatives. Cooperatives have an obligation to serve their customers at lowest cost. The generation of electricity from cooperative entities must be used entirely for the designated market and cannot be diverted to the most profitable use. The purpose of an electric cooperative is precisely to be the "provider of last resort," so they will always be at a competitive disadvantage to alternative suppliers.

Deregulation was universally expected to lead to lower retail prices. But over the last year, while regulated rates stayed constant or even dropped, high wholesale electricity prices discouraged the entrance of competitive suppliers in deregulated States.

On the other hand, cooperatives are the least likely among utilities to have real supply competition because of their mostly residential customer base. To date, many alternative providers have decided not to provide residential service at all in deregulated markets. This may be due to continued regulations that protect residential prices or other more basic reasons such as the high cost of recruiting many small customers. While coop-

eratives are less vulnerable to alternative suppliers courting their residential customers, they are highly vulnerable to "cherry picking" from their large industrial customers because they have fewer industrial customers to begin with.

The establishment of retail competition has been plagued by many problems, especially in California. No consumer wants to be exposed to the volatility characteristic of wholesale electric markets. And deregulation proponents may have overestimated the public's desire to shop around for electricity deals. Given the problems to date, retail competition has taken a back seat to wholesale market issues, thereby giving policymakers more time to weigh its pros and cons.

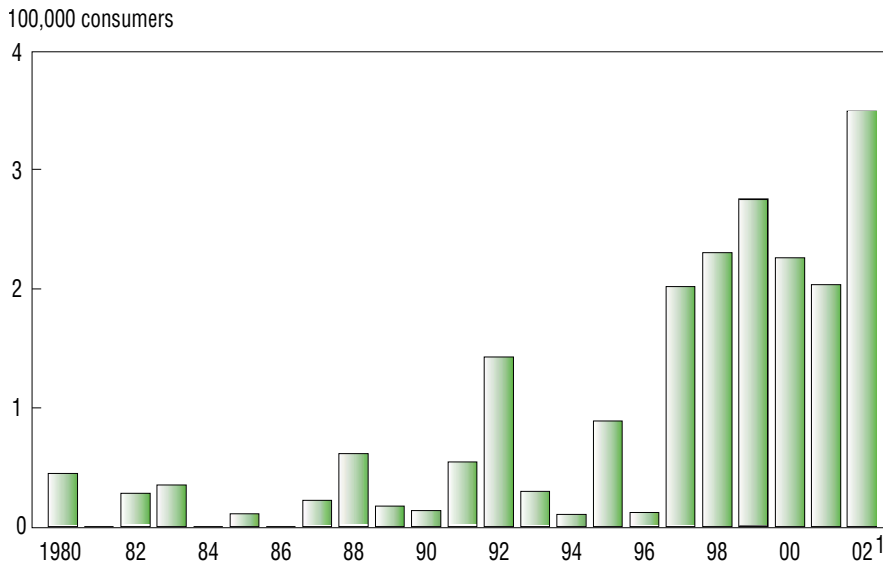
Mergers and Market Structure Issues

In preparation for the competitive market, investor-owned utilities have sold a large percentage of their generation capacity to firms that specialize in generation. In New England, where divestiture was required, 100 percent of the total generation capacity was sold; in the Mid-Atlantic, 43 percent of the capacity was sold; and in the Pacific Northwest and California, 36 percent of capacity was sold. Nationally, 22 percent of capacity had been sold as of April 2000.

With reorganization has come consolidation. The number of firms owning generation capacity declined from 172 in 1992 to 141 by the end of 2000. Of greater concern in terms of market power is the concentration of generation capacity in the hands of fewer and fewer large holding companies. The 10 largest utilities owned 36 percent of total IOU generating capacity in 1992; they owned 51

Figure 3

Number of consumers affected by rural electric cooperative mergers, 1980-2002
RECs are consolidating in response to industry changes



¹2001 and 2002 are estimates.
Source: NRECA.

percent by the end of 2000. These increases in market share have raised concerns about the competitiveness of generation markets, and they may be even more harmful to the competitive structure of markets if those markets are more remote.

Concentration in the generation side of the industry has been a continuous problem for the United Kingdom, where deregulation began in 1990. Wolak and Patrick's analysis found that two factors contributed to market power: the relative size of producers to each other and the number of producers. The more producers there are, the less any one of them can influence prices. If one large generating firm knows that it will supply the bulk of electricity, it can withhold supply in order to drive up the price.

The number of mergers among rural electric cooperatives has also increased significantly in recent years. One of the biggest threats to

cooperative survival in a competitive world will be their small size, and to the extent that the IOUs continue to feel the need to grow, the cooperatives will definitely need to follow suit. Figure 3 shows the growth of mergers among cooperatives measured by the number of customers served.

Distributed Generation

Distributed generation is often suggested as a solution for rural areas, and in many ways, it can be an important development option, especially in the long term. "Distributed generation" usually refers to small generation facilities located close to the end-user that use renewable technologies such as photovoltaics, fuel cells, microturbines, and small wind turbines. Most of these technologies are expensive at present, though their prices are expected to decline. The cost of wind power has already declined substantially.

The main advantage of distributed generation for rural areas is that it can be used instead of extending or repairing the traditional transmission and distribution (T&D) lines. About half of the T&D lines in rural areas will soon need replacing. Photovoltaics, wind, and fuel cells are likely to be used in the coming years, according to a study by Hoff and Cheney and according to the National Rural Electric Cooperative Association (NRECA) in their 2001 policy paper on distributed generation.

In general, distributed generation can be costly to utilities to the extent that they have to pay off debt incurred to build T&D infrastructure that is no longer needed. Distributed generation can also be costly to a utility if it threatens the balance of supply and demand that is continuously managed by system operators. This can happen if too many households install small systems but stay connected to the grid for their peak demand needs and for supplying extra electricity back to the utility.

But reductions in demand due to distributed generation installations can also represent savings to the utilities if those customers had been heavy peak users. For a cooperative, the question of whether distributed generation is beneficial or not is less ambiguous than for an IOU. The cooperatives are only concerned with reducing costs and not, like an IOU, maximizing profits via higher demand. Cooperatives are more likely to need to reduce peak demand since they do not have a variety of users able to use the off-peak excess supply.

Rural areas tend to be the best sites for many renewable energy technologies, such as wind and solar energy. For wind, the prime areas are in the Great Plains and

near the Rocky Mountains. There are several problems with wind and solar, primarily that they are not controllable sources of energy. There is no switch to turn them on and off, and such control is an important aspect of electricity supply. But, there are ways of using these sources, and since solar energy is most available during peak periods during the day, it matches peak energy needs.

Conclusions

Given that rural areas are more expensive to serve than urban areas, the goal of rural electric provision should be to keep rates as low as possible. The biggest threat to that goal would be the exercise of market power either in generation, transmission, or some combination of the two. Rural areas are

more susceptible to market power problems because of their isolation and small size. Since the deregulation of wholesale markets is proceeding, independent of what happens with the deregulation of retail markets at the State level, the protection of rural areas from excessive price increases will depend on the creation of truly competitive wholesale markets. Economists' understanding of how market power may be exercised in the control of transmission rights is an area of market design that deserves further attention. Consolidation in generation markets could also be detrimental to rural customers.

Cooperatives and the different ways they function need to be considered in the drafting of legislation. Cooperatives have been very successful as business enterprises,

but the extra costs they naturally incur in serving rural areas need to be taken into account when redesigning policy. Many analysts take their success for granted, but it is likely that they will continue to need the Federal support they currently receive as well as special consideration in the design of market rules.

Rural concerns point to areas in which general public interests may be vulnerable, as in the guarantee of universal service and the ability of the market to provide it. The challenge for policymakers will be to introduce market mechanisms that promote efficiency while also guaranteeing access to quality electric service for all customers. [RA](#)

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Small Town Development in China

A 21st Century Challenge

Fred Gale
Hongguo Dai

China has one of the world's fastest-growing economies and is expected to become an important player in the world economy with its accession to the World Trade Organization (WTO), but it is still a largely rural country. While China is an emerging force in high-tech industry, the majority of its labor force still works on tiny semi-subsistence farms, earning incomes a little over one-third of the urban average in China. Efforts to raise rural incomes are now a high priority in China, and the urgency is made greater by China's new WTO membership, which will expose China's farmers to competition from highly efficient overseas producers.

The success of China's rural development efforts is relevant not only for China, but also for farms and businesses in rural America, for whom their counterparts in rural China may be either customers or competitors. Many agricultural commodities and industrial goods produced in rural America may face competition from China. At the same time, rural economic

China is placing a high priority on urbanizing and raising the incomes of its huge rural population. The government is pursuing a strategy that seeks to channel rural people into small cities and towns rather than large cities. This strategy faces challenges in creating jobs for new residents and financing new town construction. Farms and businesses in rural America may increasingly compete and do business with their counterparts in rural China as trade between the two countries increases.

growth and a more open market after WTO accession may create market opportunities in rural China for agricultural commodities, livestock, fertilizers, industrial machinery and equipment, and other products produced in rural America.

Late Start in Urbanization

The industrial revolution that played an important role in urbanizing Europe and North America was slow to take off in China. During the 19th and early 20th centuries, most modern industry in China was in a few coastal cities, and in 1949 the population was 89 percent rural. By comparison, the U.S. population was 89 percent rural in 1840, but the rural share was down to 40 percent by 1949. During the first three decades of the People's Republic of China (1949-79), economic development policy focused on urban industrialization. In rural China, farmers were organized into communes and a household registration system prevented migration to urban areas.

Farm prices were kept low to subsidize urban consumers and processors, depressing rural incomes. There was little nonfarm employment in rural areas and the farm population grew steadily until population control policies in the 1970s reduced birth rates. At the start of rural reforms in 1979, after communes were dismantled and the government began to encourage development of rural industry, the Chinese population was still 82 percent rural.

During the 1980s and 1990s, China's burgeoning and increasingly market-based economy improved the welfare of farmers and provided nonfarm opportunities for rural residents. The rural share of population fell to 64 percent in 2000 and over 100 million rural nonfarm jobs were created, but there is still a long way to go. In 2000, China had 328 million rural people working in agriculture, and per capita income for rural residents of China was just 2,253 yuan, or \$270. In order to raise incomes and productivity of rural residents,

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China will need an exodus of farm labor similar to what occurred in the United States during the 20th century, but on a much larger scale. Some observers estimate that China has over 200 million “surplus” farm workers who need to be put to work in other sectors.

Leave the Land, Not the Countryside

How will this transfer of labor take place? In the United States, large migrations from farms to cities and rural industrial development occurred with little government planning or regulation. In general, China has rapidly increased its reliance on markets to allocate resources and accomplish policy objectives, but government planning and guidance are prominent in its approach to addressing rural problems. Most new jobs are being created in cities, but China's government leaders are concerned about possible social and political instability that could result from massive rural-urban migration. The government continues to limit the flow of rural people to cities by maintaining the household registration system (although restrictions are being loosened), and it is trying to engineer migration patterns by encouraging small city and town development.

The government's affinity for central planning is evident in its small town development policy—a massive effort to construct towns and small cities across the country to absorb excess population no longer needed on farms. This “rural urbanization” policy is symbolized by the slogan, “Leave the land, but not the countryside; enter the factory, not the city.” The goal is to channel agricultural laborers into new towns and small cities that are close to the countryside. Small mar-

Urban Statistics in China

China's urban population statistics can be based either on where people live or on their official registration status. Administratively, China's territory is divided into over 2,000 counties and urban districts. In statistical reporting, counties are often termed “rural” (as opposed to urban districts), but counties adjacent to large cities are sometimes included in city population totals reported in statistical publications. For example, the Beijing municipality (which has administrative status equivalent to that of a Province) includes a city proper, plus four inner suburban districts, three outer suburban districts, and seven outlying counties. To make matters more confusing, towns or small cities within a county are considered “urban” and many urban districts include large swathes of functionally rural areas. Some urban statistics on population, land, agricultural production, or other items include all the districts and counties under a city's administration, while others do not.

Another common measure of urban population is based not on where people live, but on their household registration status. Persons are classified as either “agricultural” or “nonagricultural,” usually based on the household head's occupation. Agricultural/nonagricultural is often synonymous with rural/urban in Chinese population statistics. The nonagricultural population consists of mostly employees of the government or state-owned enterprises and their dependents. Most of the nonagricultural population live in cities, although teachers, doctors, and administrators in rural areas also are classified as nonagricultural. In Beijing city proper, most of the population is nonagricultural, but in Beijing's counties 700,000 of the 3 million residents are nonagricultural. In China's small towns, over 55 percent of residents are “agricultural.” China's 2000 population census was the first to count people on the basis of their actual residence, and it found a much larger number of urban people than was reported in previous statistics.

Beijing municipality administrative divisions

Measure	Unit	City proper	Inner suburbs	Outer suburbs	Counties
Land area	Square km	87	1,283	4,105	11,333
Population	Million	2.6	4.9	1.7	3.0
Nonagricultural population	Million	2.4	3.6	0.6	0.7
Villages*	Number	0	342	1,548	2,142
Townships	Number	0	0	28	57
Towns	Number	0	1	38	66

*Administrative village committees.

Source: Beijing Municipal Statistical Bureau, 1999 *Beijing Statistical Yearbook*.

ket towns and townships are being upgraded into incorporated towns, and major towns are being developed into small cities. (In China, towns are considered “urban,”

while townships are “rural”—see box, “Urban Statistics in China.”)

An example is the Shanghai municipal government's plan to develop 11 new satellite cities and



Photo courtesy Fred Gale, Economic Research Service, USDA.

22 centralized towns as part of its 2001-2005 5-year plan. The first satellite city, Songjiang, will take 5 years to construct, cover 14 square miles, and have a population that is expected to reach 500,000. The plans aim to attract urban middle-class Shanghai residents to move to Songjiang to start businesses that will employ migrants from the surrounding rural villages. Plans include installation of modern communications and electrical power infrastructure.

The success of China's small town urbanization policy is crucial to the country's ability to spread the benefits of economic growth and to maintain social stability. Policymakers anticipate that rural people will find higher paying jobs in towns and cities. By turning subsistence farmers into urban consumers, it is reckoned that demand for housing, appliances, and other items will rise. Infrastructure investment in new towns and cities is also expected to help pump more demand into the economy. Planners also believe that urbanizing the population will reduce the land area used for housing (freeing more land for crop production), improve education, and slow population growth.

Urbanization Is Underway

Since the 1990s, controls on population movement have weakened, and many rural people have migrated to cities, often illegally. China's agricultural census reported that 57.3 million rural residents were working in urban areas in 1996. Other reports suggest that 100 million rural Chinese moved to cities during the 1990s. The 2000 census showed that the urban share of population had reached 36 percent, much higher than the urban share shown in earlier population estimates. At the same time, more places were given city or town status, which carries prestige and other benefits. The number of cities grew from 479 to 667 during the 1990s, and the number of towns grew from 11,392 to 19,216. There are plans to establish 10,000 more small cities and towns in future years. China's planners project that the urban share of population will rise to 50 percent within the first two decades of the 21st century.

The government is hesitant to allow large-scale rural-urban migration, but the need to urbanize the population is widely accepted in China. Thus, the small town development thrust has been a high priority. A number of Provinces have

been experimenting with reforms of the household registration system that allow rural people to move to small cities and towns, and Guangdong will be the first Province to register people according to where they live rather than agricultural-nonagricultural classification. In 2001, a major national reform allowed rural people to apply for permanent urban residence, but the policy is limited to county-level cities and administrative towns, and the "catch-22" is that one has to have already established residence and employment in a city or town before applying for official residence.

Rural Urbanization in China's Development

In the early years of economic reforms after 1978, China focused development efforts on a few coastal cities. Gradually, economic growth spilled over to inland areas, and "rural urbanization" began to appear in Guangdong Province, adjacent to Hong Kong; Zhejiang Province to the south of Shanghai; and southern Jiangsu Province to the north of Shanghai (see map, p. 17). These areas are noted for transformation of rural villages to modern towns and cities. For example, Shenzhen, the most prominent of China's "special economic zones," began as a village.

This rural urbanization was based on highly successful, often export-oriented, village-owned manufacturing enterprises. These enterprises benefited from China's related policy of encouraging the development of rural industry, which accounts for a large share of national output and exports. There are several models of Chinese rural industry growth. Areas in Guangdong Province benefited from ties to Hong Kong, as enterprises grew

through foreign capital investment and links to overseas markets. Jiangsu rural enterprises are usually owned by village collectives, while Zhejiang Province is known for strong private ownership and entrepreneurship.

During the 1990s, small towns also flourished in other coastal Provinces, such as Fujian and Shandong, and in other rural areas in advantageous locations, such as in the suburbs of Beijing. These places did well because they had access to export markets or enjoyed spillovers from growing cities.

Huge Investment Needed

The challenge faced by China is to somehow reproduce the rural urbanization model on a massive nationwide scale. If the entire "surplus" agricultural population were relocated to towns, it would more

than double the current town population of 170 million. Thus, a huge number of new towns will need to be established, after having already increased during the 1990s by over 7,800 (fig. 1) (the number of small cities grew by 173).

Huge investment will be needed to build housing, roads, water and sewer, electric and gas systems for new towns. Some commentators have argued that new towns will boost investment demand. However, it is not clear where the investment funds will come from. In wealthy areas (almost exclusively on the coast), investment in small towns has occurred at a rapid pace, but investment funds will be more difficult to come by for towns in less favorable locations. Reports suggest that many local governments are already in serious financial difficulty, with many near

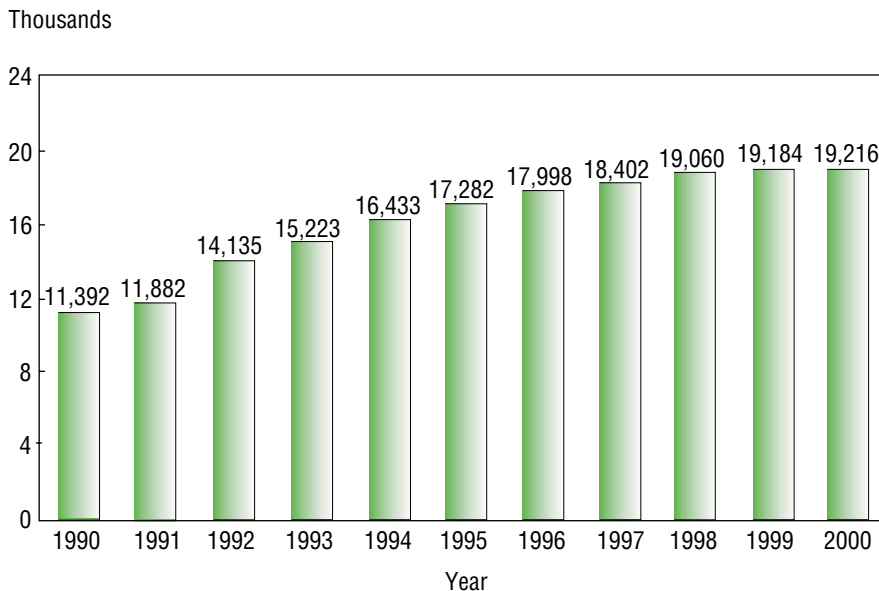
bankruptcy and local officials and teachers going unpaid for months at a time (*Zhongguo Xinwen Zoukan*). The capacity of new towns to invest in infrastructure depends on their ability to create jobs and develop industry. There will be no way for local governments to pay back borrowed funds without a strong local tax base, and private investment in housing will not occur unless there are jobs and income for new residents.

Job Creation Is Key

While there is much discussion about developing small towns and the advantages of this approach to urbanization, there is little discussion of how jobs will be created to support new residents. An urban place must have an economic base to provide jobs and incomes for its residents. Once the economic base is in place, jobs with input suppliers and retail/service businesses spring up as income from "basic" industries is respent in the economy. In successful examples of rural urbanization in China, the economic base was often township and village enterprises. Other towns derived their economic base from their geographic location as a center for regional trade, transportation, or government.

Increases in rural industrial employment large enough to absorb huge numbers of rural migrants seem unlikely. China's manufacturing industries are already suffering from overcapacity in many sectors; hence, large-scale investment in new production seems unlikely. Growth of rural industry stalled in the late 1990s due to reduced demand during the Asian financial crisis, a major consolidation of the textile industry, and difficulties obtaining credit in rural areas. Greater competition as

Figure 1
Number of towns in China, 1990-2000
 Towns nearly doubled in number during the 1990s



Note: A town is a seat of county government or other officially recognized urban space that does not meet the criteria for being a city (see "Urban Statistics in China").
 Source: China National Bureau of Statistics, China Statistical Abstract 2001, Beijing: China Statistics Press, May 2001.

Table 1

China rural industry worker productivity and town financial revenue by region, 1999

Eastern towns have much stronger nonfarm industry and financial revenue

Measure	Unit	Region		
		East	Central	West
Rural industry				
Average town employment	Number	5,277	3,445	1,909
Value added per worker ¹	Dollars	3,360	2,270	1,573
Value of exports	Billion dollars	91.8	8.3	1.6
Average town financial revenue				
	Thousand dollars	1,600	580	400

¹Value added divided by employment for township and village industry (gongye) enterprises.

Note: Values were converted to dollars using exchange rate of 1 dollar = 8.27 yuan.

Sources: ERS calculations based on data from Zhongguo Xiangzhen Qiye Nianjian 2000 (China Township and Village Enterprise Yearbook, 2000), and Zhongguo Nongcun Xiangzhen Tongji Gaiyao 2000 (China Statistical Survey of Rural Townships and Villages, 2000).

a result of China's membership in the World Trade Organization will dampen job growth in many industries by increasing the pressure to cut costs.

Links to urban markets, capital investment, skilled workers, and technology are becoming more important as both Chinese and overseas consumers increase their demand for quality products. Markets will change more rapidly and competition will increase as China opens its borders to more imports, putting a premium on market information, technology, management, and skilled labor. Large urban areas often have better access to these factors of production, making it more difficult for rural enterprises to compete.

As in the United States, processing of agricultural products is often mentioned as a potential source of jobs and income for small towns in China. For example, plants producing ethanol, corn sweeteners, and other value-added products are being constructed in corn-producing Provinces of north-

ern China. However, this value-added rural job creation strategy would go against current trends. For many types of processing, large modern facilities are being built in centralized locations (usually cities) where they can collect large quantities of raw agricultural commodities from a wide area, operate on a large scale to reduce per-unit costs, and be near consumer markets and ports (also in cities). New technologies and management practices, better sanitary control, and quality are also increasingly important in food processing industries. Consolidation of China's meat industry into fewer, larger, well-financed companies is expected to improve sanitation, quality, and export potential, but may reduce employment.

Weak Industry in Interior Provinces

While development of small towns in coastal areas has been hugely successful, the ingredients for success may be missing in China's interior Provinces and even

in less-developed regions of coastal Provinces.

The diversity among China's regions can be seen by comparing worker productivity in rural industry across regions (table 1). Separate statistics are not available for industries in towns, but statistics for township and village enterprises reflect the types of industries located in towns and small cities. Nonfarm employment (in rural township and village enterprises) averaged 5,277 workers in eastern towns, 3,445 in central towns, and 1,909 in western towns (these figures may exclude self-employment or jobs in privately owned businesses). In 1999, value added (gross receipts minus cost of input materials) per worker for township and village industrial enterprises in eastern Provinces was 50 percent higher than in central Provinces and double the average in China's west. About 90 percent of township and village enterprise exports came from coastal Provinces.

Since industry is much stronger in eastern Provinces, towns have a stronger tax base and better financial performance in the east. The average financial revenue reported by towns in the eastern (coastal) region was equivalent to \$1.6 million in 1999 (using the exchange rate of 8.27 yuan per dollar). By comparison, financial revenue averaged only about one-third as much in other regions: \$580,000 in central Provinces and \$400,000 in western Provinces (table 1).

Ingredients for Success

Several key ingredients are needed in order for China's small town development policy to succeed. As indicated above, development of a strong economic base in small towns and cities is essential to create jobs for residents and

build a local tax base. Plans and development policies must be aligned with trends in industry and trade. Planners should avoid developing more towns than a region can viably support.

Improved education is essential to successfully incorporate rural residents into the nonagricultural work force. Rural persons have not only fewer years of education, but also poorer educational facilities,

fewer books, and teachers with less training.

Improved rural transportation links are also essential. More and better roads and either public or private transportation services will allow rural people to shop, work, and attend school in towns even if they maintain their residence in a rural village. Agricultural economist D. Gale Johnson, citing the huge infrastructure cost of moving peo-

ple from villages to towns, has recommended that farm families keep their residences in villages and commute to nonagricultural jobs in nearby towns. Instead of leaving agriculture and rural areas altogether, many would become part-time farmers, involving less drastic change for rural families. There is already a great deal of commuting and temporary migration in rural China. Analysis of China's 1997

Figure 2
China Provinces and regions



Source: Prepared by the Economic Research Service.

agricultural census shows that about half of rural people engaged in nonagricultural work were doing so outside of their home township, with about equal proportions engaged elsewhere in their home county, elsewhere in their home Province, and outside their Province.

Better transportation between villages and towns will also help towns to develop as regional retail and wholesale trade centers.

Rural America's Competitor and Customer

Small towns and villages in China will impact rural America as both competitors and potential customers. China is among the largest

producers and consumers of many major commodities, including wheat, corn, rice, and cotton, and is an important importer of soybeans. The ability of its farmers to compete in a more globalized market after China joins the WTO could have enormous implications for U.S. farmers and their communities. The success of China's rural urbanization policies in reducing agricultural labor input and modernizing its agricultural sector will be a key factor.

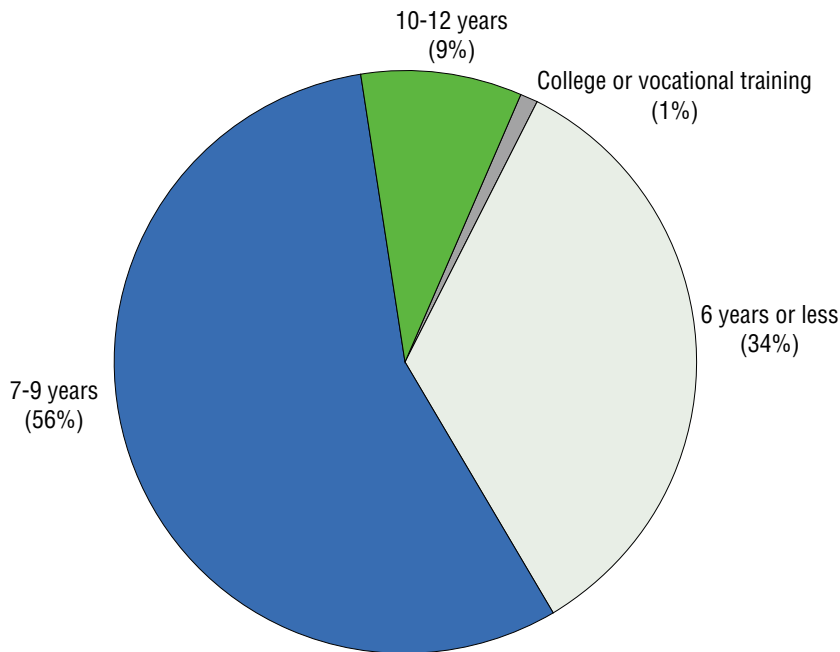
It is not clear how small town development will affect agriculture in China. Advocates suggest that moving rural people from village houses to small town apartment buildings will free up more land for

crops. Concentrating the population in towns and cities may make it easier to consolidate the country's fragmented land holdings into larger, more efficient plots to take advantage of mechanization, economies of scale, and commercialization of agriculture. However, there are also reports of towns and townships seizing farmland for urban development and sometimes wasteful, duplicative construction of buildings and infrastructure. At least one economist has argued that concentrating population in large cities would save even more land for agriculture (Jia).

Town and village industry in China is also an important competitor for U.S. rural industry. If China is successful in creating jobs for new small town residents, much of the employment will likely come in industries that are important in the rural United States. China's leading exports to the United States include toys, footwear, clothing, housewares, and consumer electronics, many of which are important employers in U.S. small towns.

There is much concern over whether U.S. businesses can compete with overseas industries that pay much lower wages. The average annual salary for township and village enterprise workers in 1999 was equivalent to \$628, based on the official exchange rate. However, productivity of workers in Chinese industry is also very low, since workers are less skilled and work with much less capital. Less than 10 percent of workers in China's rural nonagricultural jobs have completed 10 or more years of schooling (fig. 3). By comparison, 80 percent of rural U.S. workers have completed high school. Value added per worker (a measure of labor productivity) in China's township and village enterprises ranges between

Figure 3
Chinese rural nonfarm workers by years of schooling, 1997
Most workers in rural industries have completed less than 10 years of schooling



Note: Includes persons whose primary employment was in industry, construction, transportation, wholesale-retail trade, and other nonagricultural industries. Excludes persons employed primarily in crop planting, livestock husbandry, forestry, and fisheries.

Source: Estimated by ERS from 1-percent sample of rural households selected from China's 1998 agricultural census.

Table 2

**Value added per worker for selected manufacturing industries—
United States and rural China, 1997***U.S. workers have much higher productivity than workers in rural China*

Industry	Rural China	United States	Ratio
		<i>U.S. dollars</i>	
Food manufacturing	2,780	111,600	40
Beverages	2,800	209,300	75
Textiles	2,680	60,500	23
Apparel	2,240	47,500	21
Paper	2,470	122,400	50
Chemicals	3,760	254,600	68
Petroleum products	3,900	349,500	90
Stone, clay, and glass products	1,780	98,600	55
Primary metals	3,700	113,500	31
Fabricated metal products	2,860	75,700	26
Machinery	3,345	97,100	29
Electrical equipment	3,825	96,400	25
Electronics and communications	3,050	149,400	49

Note: Table includes selected manufacturing industries in roughly comparable categories. "Rural China" includes township and village enterprise. "United States" includes all manufacturing establishments. Calculations assumed 8.27 yuan per dollar. All data are for 1997.

Source: ERS calculations using data from Zhongguo Xiangzhen Qiye Nianjian 1998 (*China Township and Village Enterprise Yearbook, 1998*), and United States 1997 Economic Census.

\$2,000 and \$4,000 (table 2). According to U.S. economic census data, value added per worker in U.S. manufacturing averaged \$108,000 in 1997. In the apparel industry, for example, the average U.S. worker produced output worth \$47,500, 21 times the average output of rural Chinese workers in that industry. Thus, according to these

figures, it would take 21 workers in rural China to produce the same value of output produced by 1 worker in the United States. The U.S.-China productivity ratio is even higher in other industries that are more capital- and skill-intensive.

The productivity ratio is 40 in food products manufacturing, 68 in chemicals, and 90 in petroleum processing. Industries with high levels of skill, technology, and capital investment per worker will be in a better competitive position than those that rely on less-skilled labor.

China's new towns could also become customers for American products and services. As huge numbers of rural people move from subsistence agriculture to urban life, their demand for meat, poultry, and edible oils will expand rapidly. This will aid U.S. farmers by increasing demand for feed grains and oilseeds. If small town development allows China's agriculture to modernize, the demand for fertilizers, farm machinery, seed technology, breeding stock, and other advanced inputs will rise. The huge investment needed to build small towns and cities will increase China's demand for construction and telecommunications equipment. New manufacturing and processing capacity in towns will increase demand for industrial machinery and instruments. **RA**

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Economic Strain and Community Concerns in Three Meatpacking Communities

Rochelle L. Dalla
Sheran Cramer
Kaye Stanek

Meat processing is a \$95-billion-per-year business dominated by Iowa Beef Processing (IBP), Cargill's Excel Corporation, and Con-Agra's Monfort Incorporated. These leading companies control 70 percent of U.S. cattle slaughter and 35 percent of the hog slaughter. Meatpacking, which requires little training or English language skills, is the primary magnet attracting immigrants to the Midwestern States. Importantly, migrational patterns are shifting. Migration patterns have been primarily circular in the past, with immigrants and migrants entering a community, securing employment, and leaving after completing the work. The immigrants entering rural Midwestern communities are beginning to stay however, and new patterns are being established.

In the 1990s, as manufacturing industries moved into rural communities, manufacturing job growth

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Immigration is changing the face of rural America, and employment in the food processing industry is a major draw to the rural Midwest. This article compares perceptions of economic strain, community concerns, community services, and nutritional well-being between long-term community residents and Hispanic immigrants in three rural Nebraska meatpacking communities. Several patterns emerged. Long-term residents reporting greater personal economic strain also reported poorer nutrition and those reporting more concern with community issues (e.g., language barriers) also reported greater difficulty obtaining community services (e.g., food assistance, affordable housing). Immigrants reporting greater economic strain also reported more concern with community issues and poorer nutrition.

was faster in rural than urban areas. Between 1989 and 1994, rural counties added a net of 167,000 manufacturing jobs, while urban counties lost 1.2 million manufacturing jobs. Jobs are being created in rural areas at unprecedented rates. The dominant manufacturer in the Midwestern States is the meatpacking industry.

Many of the jobs in the meatpacking industries are labor intensive and unpleasant (e.g., slaughtering and packaging cattle, chickens, and hogs). Immigrant laborers will often accept these positions and work double shifts and overtime, which few U.S.-born people would do for comparable wages. Laborers average \$12,000-\$16,000 annually, enough to minimally support a family. Thus, more families and fewer single males are migrating into Midwestern communities. Between 1980 and 1992, the number of Hispanics in 10 Midwestern States—Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota,

Missouri, Nebraska, Ohio, and Wisconsin—rose from 1.2 to 1.8 million, while the White population in the same States declined by 400,000.

Community Impacts of Rapid Demographic Change

Immigrants are often perceived as a mixed blessing; their arrival adds to the population and labor supply, and the economic benefits from a growing industry are widely evident. Yet, population growth can tax a community's ability to provide housing, education, health care, and welfare services, and often results in a heightened sense of racism and more incidents of discrimination. Immigrant workers and their families report discrimination, denial of services (e.g., housing), police harassment, and pressure to assimilate. Teachers often lack Spanish-speaking skills, and hence immigrant children can miss the full benefits of public education. Community residents com-

plain that immigrant children's needs compromise the quality of the schools. Three rural meatpacking communities in Nebraska were chosen to survey perceptions of economic strain and community concerns among immigrant laborers and long-term residents.

Schuyler is in Colfax County, Nebraska, and has a population of 4,720. Between 1990 and 1995, the county population grew 11 percent, mostly from people moving to Schuyler for work in the Excel Beef Packing Plant. The plant has been operating in Schuyler since 1984.

In 1990, a \$24-million modernization of Excel's Schuyler and Dodge City (Nebraska) plants began. Approximately 70 percent of the Excel employees in the Schuyler plant are Latino. Fifteen long-term residents and 13 immigrants were interviewed from Schuyler. All long-term residents were White, non-Hispanic (table 1a); 5 immigrants were Mexican and 8 were Latino (table 1b). Most (n = 11) long-term residents had lived in Schuyler for more than 20 years. Immigrant participants lived in Schuyler an average of 5.5 years.

Norfolk is in Madison County, Nebraska, and has a population of 23,500. Beef America closed its doors in its Norfolk plant in 1998. At the time, approximately 90 percent of its employees were Latino. Iowa Beef Processing acquired the structure and the plant was re-opened in 1999. Approximately 60 percent of its employees are Latino. Thirty individuals, evenly divided between long-term residents and immigrant newcomers, were interviewed from Norfolk. All long-term residents were White, non-Hispanic; 7 immigrants were

Survey Questionnaires

The economic strain survey consists of 25 questions designed to assess participants' perceptions of personal/familial financial strain. Respondents answered questions based on a 5-point Likert scale ranging from 1 (never) to 5 (almost always). Sample questions included "How often do you and your family experience money problems?" and "How often are you able to put money away for future needs?" Response scores were re-coded as necessary so that higher scores indicate greater financial strain.

The **community concerns** survey asked respondents to indicate, on a 4-point Likert scale, their level of concern from 1 (not concerned) to 4 (definitely concerned) over 17 issues including alcohol use, drug use, teen use of alcohol, family conflict, spouse abuse, child abuse, marital conflict, gangs, unemployment, economic well-being, teen parenting, single parenting, adult education, youth education, housing, interethnic conflict, and language barriers.

The community services survey asked participants to indicate, on a 4-point Likert scale from 1 (not difficult to obtain) to 4 (very difficult to obtain), accessibility of 17 different services including medical care, dental care, hospital care, quality child care, after-school care, jobs for adults, job training, language development, weekend activities for youth, recreational facilities, counseling services, domestic violence intervention services, police protection, affordable housing, transportation, financial assistance, and food assistance. Higher scores indicate greater difficulty in obtaining services.

The **nutritional well-being** survey was comprised of 15 questions about the respondents' nutritional intake in the previous 3 months. Participants responded to the first 6 statements using a Likert scale ranging from 0 (don't know) to 3 (often true). Sample statements include "I worried whether our food would run out before we had money to buy more," and "We relied on only a few low-cost foods because we were running out of money to buy food." Questions 7 through 10 concerned the adequacy of food over the previous 3 months with regard to hunger and weight. If respondents indicated some degree of food insecurity, they continued with questions 11 to 15 (e.g., "In the last 3 months, did your child/children ever skip meals because there wasn't enough money for food?"). Higher scores on this survey indicate poorer nutritional well-being.

Finally, the **community assessment** questionnaire, presented only to long-term residents, consisted of 33 questions, such as "To what extent do language barriers affect community functioning?" and "To what extent does the community understand and accept the cultural patterns of the immigrant newcomers?" Respondents answered on a 5-point Likert scale ranging from 1 (not at all) to 5 (almost always). Response scores were re-coded so that higher scores indicate a more positive assessment of the community.

Table 1a

Personal information: Long-term community residents

Variable	Schuyler (n=15)	Norfolk (n=15)	Madison (n=15)	Total (n=45)
Age:				
Mean	54.7	44.0	44.7	47.8
Range	33-76	23-71	36-78	23-78
Ethnicity:				
White	15	15	15	45
Marital status:				
Single	0	1	0	1
Married	11	12	14	37
Divorced	2	2	1	5
Widowed	2	0	0	2
Residence:				
Own home	14	13	13	40
Rent home/apt.	1	2	2	5
Education:				
Mean (no. years)	13.7	14.6	13.5	13.9
Range	12-16	12-16	12-16	12-16
Children:				
Mean (no.)	2.3	2.7	3.1	2.7
Range	1-5	1-5	1-6	1-6
Annual income:				
< \$10,000	2	0	1	3
\$10,000-\$20,000	2	4	2	8
\$20,000-\$30,000	5	1	2	8
\$30,000-\$50,000	4	4	7	5
> \$50,000	2	6	3	11
Time in community:				
1.0 - 6.0 (Years)	1	1	2	4
6.1 - 10.0	1	1	0	6
10.1 - 20.0	2	4	3	9
> 20.0 years	11	9	10	30

Source: Hatch Survey (Dalla, Cramer, and Stanek, 1999).

Mexican and 8 were Latino. The majority of long-term residents (n = 9) had lived in Norfolk more than 20 years; an equal number of immigrants had lived in the community 6 years or less.

Madison, 25 miles south of Norfolk, is the county seat of Madison County. It has a population of approximately 2,300 individuals. The Madison Foods pork processing facility was constructed

in 1973 and is operated by IBP. The plant employs 1,000 people, approximately 65 percent Latino or Mexican. More than 60 percent of the approximately 220 students at Madison Elementary School come from Spanish-speaking households, up from 30 percent in 1996. Thirty individuals were interviewed from this community, evenly divided between long-term residents and immigrant newcomers. The aver-

age age of long-term resident participants was 44.7 years; immigrants averaged 33.7 years. All long-term residents were White, non-Hispanic; immigrants were Mexican (n = 10) and Latino (n = 5). Most (n = 10) long-term residents had lived in Madison for more than 20 years; most immigrants (n = 14) had lived there 6 years or less.

A total of 88 participants were interviewed at length by the principal investigator or a graduate assistant. Individuals completed a series of survey questionnaires (in English or Spanish) on economic strain, community concerns, community services, and nutritional well-being (see "Survey Questionnaires"). Long-term residents completed an additional community assessment survey.

Patterns of Similarity Across Respondents and Communities

Schuyler. Long-term residents rated their communities highly. They also reported more community concerns (e.g., language barriers, interethnic conflict), but greater ease in obtaining community services such as medical assistance and adult education than did Schuyler immigrants. Those residents and immigrants reporting greater concern with community issues reported much greater difficulty in obtaining community services. Schuyler immigrants reporting greater economic strain also reported poorer nutritional well-being. Compared with long-term residents, immigrants experienced (1) significantly greater economic strain, (2) significantly greater difficulty obtaining community services, and (3) poorer nutrition.

Norfolk. Long-term residents responded similarly to long-term residents in Schuyler. Specifically, a positive community assessment

was significantly related to fewer communitywide concerns, greater economic strain was significantly associated with poorer nutrition, and greater concern with community issues was significantly related to greater difficulty obtaining community services. However, additional patterns emerged in Norfolk. Among long-term residents, greater

economic strain was significantly related to (1) more concern with community issues (e.g., language barriers, interethnic conflict) and (2) greater difficulty in obtaining community services. Finally, greater concern with community issues was significantly related to poorer nutritional well-being among all residents.

Among Norfolk immigrants, greater economic strain was related to (1) more community concerns and (2) poorer nutrition. (Nutritional well-being was also related to community concerns.) Simply put, those with greater financial strain expressed greater concern regarding community issues and poorer nutrition. Each of these patterns was also significant among Norfolk long-term residents, implying similar perceptions between the immigrant and long-term resident groups. However, group comparisons (table 2) revealed significantly greater economic strain among the immigrants than the long-term residents.

Madison. Long-term residents with a more positive assessment of the community reported greater ease in obtaining community services (a pattern also found among long-term residents in Schuyler and Norfolk). Those reporting greater economic strain reported significantly more concern with community issues (e.g., language barriers) and significantly poorer nutrition. Finally, long-term residents showing greater concern with community issues reported significantly greater difficulty in obtaining community services.

Immigrants in Madison reporting greater economic strain also had significantly more concern with community issues and significantly poorer nutrition. Group comparisons revealed significantly greater economic strain and poorer nutrition among immigrants than reported by the long-term residents of Madison.

Table 1b

Personal information: Immigrant participants

Variable	Schuyler (n=15)	Norfolk (n=15)	Madison (n=15)	Total (n=45)
Age:				
Mean	34.4	41.9	33.7	36.6
Range	18-69	22-67	22-51	18-69
Ethnicity:				
Mexican	5	7	10	22
Latino/a	8	8	5	21
Marital status:				
Single	5	1	1	7
Married	7	9	12	28
Divorced	1	4	2	7
Widowed	0	1	0	1
Residence:				
Own home	3	4	11	18
Rent home/apt.	8	8	3	19
Friends/relatives	2	3	1	6
Education:				
Mean (no. years)	9.2	8.9	8.5	8.9
Range	4-14	4-15	4-14	4-14
Standard deviation	3.8	3.6	3.2	3.5
Children:				
Mean (no.)	3.5	4.6	3.1	3.7
Range	0- 4	1- 2	1-6	0-14
Annual income:				
< \$10,000	1	5	0	6
\$10,000-\$20,000	3	6	4	13
\$20,000-\$30,000	5	4	8	17
\$30,000-\$50,000	5	0	2	7
Time in community:				
1.0-3.0 (Years)	4	6	6	16
3.1-6.0	4	3	8	15
6.1-10.0	3	4	1	8
10.1-20.0	2	2	0	4

Source: Hatch Survey (Dalla, Cramer, and Stanek, 1999).

Table 2

Survey information: Responses to survey questions

Community/topic	Mean		Range ¹		Standard deviation	
	Resident	Immigrant	Resident	Immigrant	Resident	Immigrant
SCHUYLER:						
Community assessment	3.49	-----	2.9 - 4.1	-----	.36	----
Economic strain	2.04	2.32**	1.4 - 3.5	1.2 - 3.3	.61	.66
Community concerns	3.01	2.87	1.7 - 3.9	1.2 - 4.0	.54	.80
Community services	2.04	2.50	1.3 - 2.6	1.5 - 3.8	.41	.74
Nutritional well-being	1.01	1.19*	1.0 - 1.1	1.0 - 1.5	.69	.20
NORFOLK:						
Community assessment	3.41	-----	2.4 - 4.2	-----	.51	----
Economic strain	2.18	2.90*	1.4 - 3.1	2.0 - 3.6	.56	.54
Community concerns	3.08	3.05	2.1 - 3.9	1.5 - 3.9	.58	.71
Community services	2.16	2.23	1.2 - 3.4	1.2 - 3.6	.54	.73
Nutritional well-being	1.56	1.74	1.4 - 2.0	1.4 - 2.2	.19	.23
MADISON:						
Community assessment	3.35	-----	2.5 - 4.1	-----	.40	----
Economic strain	2.10	2.72*	1.5 - 3.0	1.7 - 3.8	.45	.57
Community concerns	2.86	2.80	1.5 - 4.0	1.0 - 4.0	.66	.93
Community services	2.23	2.19	1.5 - 3.8	1.1 - 3.5	.64	.68
Nutritional well-being	1.03	1.27*	1.0 - 1.2	1.0 - 1.8	.80	.30

Source: Hatch Survey (Dalla, Cramer, and Stanek, 1999).

*p < .05; **p < .01 (Asterisk indicates significant differences between resident and immigrant responses to survey questions).

¹Possible scale range 1-4 on all surveys except community assessment (1-5) and nutritional well-being (1-3).

Implications for Policymakers, Educators, and Social Service Providers

Consistent patterns emerged in all three communities with regard to economic strain, community concerns, community services, and nutritional well-being. Interestingly, patterns of response were similar for both long-term resident and immigrant participant groups. Simply stated, long-term residents and immigrant newcomers appear more alike than different. Community concerns often derive from trouble with accessing services; nutritional well-being is often compromised by economic strain. And this occurs across the board. Immigrant influx into rural meatpacking communities often

results in heightened interethnic tension, thus reducing the potential for collaboration and partnership development. Helping rural community residents, regardless of cultural or ethnic background, acknowledge similarity may promote unity and mutual problem-solving in addressing like concerns.

In both groups, economic strain was consistently related to poor nutrition and greater concern with community issues. The first pattern (i.e., economic strain and poor nutrition) makes intuitive sense. Those with less discretionary income are more likely to limit their diets, to purchase less expensive foods, to forgo more expensive items, and to cut meal size or skip meals.

The second consistently significant pattern, the association between economic strain and community concerns, is more difficult to interpret. Perhaps those with fewer economic resources, regardless of community tenure, are more likely to seek social services (e.g., financial assistance), thus becoming more aware of community problems due to contact with others in similarly vulnerable positions. It is equally likely that those living on a limited income or suffering financial hardship live in neighborhoods near families of similar economic means and that community needs (e.g., adult education, affordable housing) are more evident.



Photo courtesy, Economic Research Service, USDA.

Results of this investigation are significant for policymakers, educators, and social service workers alike. First, immigrant participants clearly experienced greater economic strain than long-term residents. Adult education and employment training services are needed to assist immigrant laborers in obtaining higher paying positions. Second, nutritional deficits were reported particularly by immigrant laborers. Workshops offered onsite (that is, at the packing plants where many immigrants are employed) and in Spanish may promote nutritional well-being among immigrant laborers and their families.

Finally, immigrant laborers and their long-term community counterparts reported remarkably parallel perceptions of community status as it related to individual welfare. Education focused on mutual needs (e.g., budgeting, job training), community concerns (e.g., child education and adolescent drug use) and goals (e.g., individual and family well-being) may bring diverse cultural groups together in communities struggling with rapid demographic change. [RA](#)

For Further Reading . . .

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Expenditures on Children by Rural Families

Mark Lino

Total expenses on a rural child in real terms have increased from 1960 to 2000. Food expenses have decreased, but health care and child care/education expenses have increased more. These trends highlight the importance of updating the expenditure base of USDA's cost of raising a child series.

Since 1960, the U.S. Department of Agriculture (USDA) has provided annual estimates of family expenditures on children in both urban and rural areas. USDA's annual childrearing expense estimates are used in four major ways:

- **Determining State child support guidelines.** Under the Family Support Act of 1988, States are required to have numeric child support guidelines and to consider the economic costs of raising a child in these guidelines. The economic well-being of millions of children are affected by child support.
- **Determining State foster care payments.** In 1998, about 520,000 children were in foster care.
- **By courts to appraise damages arising from personal injury or wrongful death cases.** For example, if a person with children is hurt on a job such that he or she cannot work, the courts use the expense figures

to determine compensation for the family.

- **In educational programs for anyone considering having children.** These expense estimates may encourage teens to wait until they are more financially prepared to have children.

For urban areas, childrearing expenses are estimated for families in four regions (Northeast, South, Midwest, and West). For this study, the four urban regions were combined into a single overall urban average. Rural areas are places of fewer than 2,500 people outside a Metropolitan Statistical Area and cover the entire country.

Expenditures on Children by Rural Families

Family expenditures on children are less in rural than in urban areas. For middle-income families, those in rural areas spent \$156,720 to raise a child up to age 18, whereas those in urban areas spent \$169,130 (table 1). Housing is the

primary reason for the cost discrepancy. Housing, which accounts for the largest share of childrearing expenses, represents a smaller percentage and dollar amount for rural families (\$44,190 in middle-income families) than urban families (\$58,790). Food expenses (the second largest childrearing cost) for a child are also lower in rural areas. (For more detail, see "USDA Methodology for Estimating Expenditures on Children by Families," p. 28.)

Transportation (the third largest childrearing cost) and health care expenses for a child are higher in rural than urban areas. For rural middle-income families, total transportation expenses on a child for the first 18 years are \$26,580 and total health care expenses are \$12,630. For urban middle-income families, these figures are \$23,890 and \$11,350 (table 1). Families in rural areas have longer distances to drive when they make child-oriented travel and may need a second vehicle because of the presence of children. Also, families in rural

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areas may have less health insurance coverage so have to pay more out of pocket for health care.

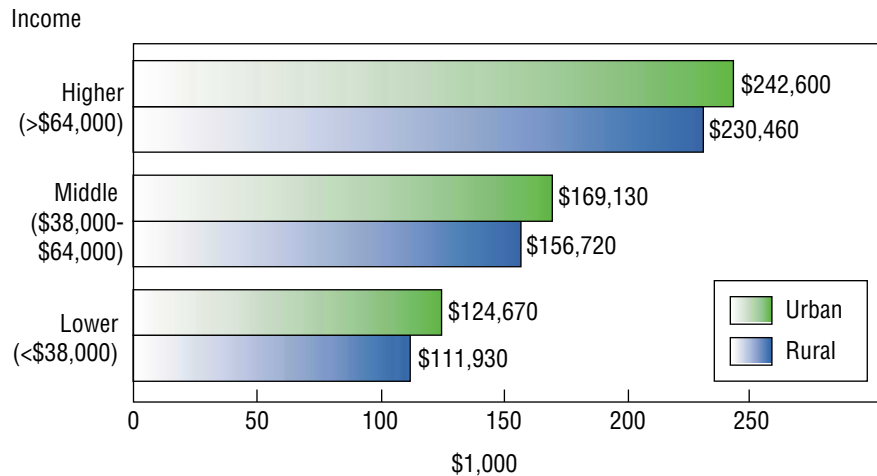
As household income rises for both rural and urban families, so do expenditures per child (fig. 1).

Rural and urban families in the lower income group spent \$111,930 and \$124,670 over 18 years—or about \$6,220 per year for rural families and \$6,930 per year for urban families. Rural and urban families in the higher income group spent \$230,460 and \$242,600, or \$12,800 per year (rural) and \$13,480 per year (urban).

Although family expenditures on children are less in rural areas, this gap, in percentage terms, declines as household income rises. For the lower income group, the difference in childrearing expenses between rural and urban families is

Figure 1
Expenditures on a child up to age 18 (in 2000 dollars) by income and residence

Expenditures rose with household income for both rural and urban families



Source: U. S. Department of Agriculture, *Expenditures on Children by Families, 2000 Annual Report*.

Table 1

Expenses on a child up to age 18 by rural and urban families, by income and budgetary component, 2000

Housing expenditures on children are less in rural than urban areas, but transportation expenditures are greater in rural areas

	Lower income	Middle income	Higher income
Rural families:			
Housing	\$29,310 (27%)	\$44,190 (27%)	\$76,230 (33%)
Food	22,920 (20%)	27,750 (18%)	34,470 (15%)
Transportation	19,440 (17%)	26,580 (17%)	35,100 (15%)
Clothing	9,030 (8%)	10,650 (7%)	13,620 (6%)
Health care	9,690 (9%)	12,630 (8%)	14,580 (6%)
Child care/education	9,450 (8%)	16,650 (11%)	26,790 (12%)
Miscellaneous	12,090 (11%)	18,270 (12%)	29,670 (13%)
Total	\$111,930	\$156,720	\$230,460
Urban families:			
Housing	\$43,880 (36%)	\$58,790 (35%)	\$90,950 (38%)
Food	24,530 (20%)	29,270 (17%)	35,870 (15%)
Transportation	16,730 (13%)	23,890 (14%)	32,360 (13%)
Clothing	9,170 (7%)	10,780 (6%)	13,780 (6%)
Health care	8,570 (7%)	11,350 (7%)	13,200 (5%)
Child care/education	9,260 (7%)	16,370 (10%)	26,360 (11%)
Miscellaneous	12,530 (10%)	18,710 (11%)	30,080 (12%)
Total	\$124,670	\$169,130	\$242,600

Notes: Budgetary shares in parentheses. Estimates of 2000 family expenditures on the younger child in husband-wife households with two children by rural-urban residence. The expenses are for a child up to age 18 and for lower, middle, and higher income groups of households (approximate before-tax income under \$38,000, between \$38,000 and \$64,000, and over \$64,000).

Source: U.S. Department of Agriculture, *Expenditures on Children by Families, 2000 Annual Report*.

USDA Methodology for Estimating Expenditures on Children by Families

USDA provides annual estimates of expenditures on children by married-couple and single-parent families from birth through age 17. (The expenditures on children by single-parent families are not available by rural/urban area because of sample size limitations.) Expenditures on children are estimated for the major budgetary components: housing, food, transportation, clothing, health care, child care/education, and miscellaneous goods and services.

Housing expenses consist of shelter (mortgage interest, property taxes, or rent; maintenance and repairs; and insurance), utilities (gas, electricity, fuel, telephone, and water), and house furnishings and equipment (furniture, floor coverings, and major/small appliances). For homeowners, housing expenses do not include mortgage principal payments; in the data used, such payments are considered to be part of savings.

Food expenses consist of food and nonalcoholic beverages purchased at grocery, convenience, and specialty stores, including purchases with food stamps; dining at restaurants; and household expenditures on school meals.

Transportation expenses consist of the net outlay on purchase of new and used vehicles, vehicle finance charges, gasoline and motor oil, maintenance and repairs, insurance, and public transportation.

Clothing expenses consist of children's apparel such as diapers, shirts, pants, dresses, and suits; footwear; and clothing services such as dry cleaning, alterations and repair, and storage.

Health care expenses consist of medical and dental services not covered by insurance, prescription drugs and medical supplies not covered by insurance, and health insurance premiums not paid by employer or other organization.

Child care and education expenses consist of daycare tuition and supplies; babysitting; and elementary and high school tuition, books, and supplies.

Miscellaneous expenses consist of personal care items, entertainment, and reading materials.

The most recently calculated childrearing expenses are based on 1990-92 Consumer Expenditure Survey (CE) data updated to 2000 dollars using the Consumer Price Index (CPI). The CE, administered by the Bureau of Labor Statistics (BLS), United States Department of Labor, is the only Federal survey of household expenditures collected nationwide. It collects information on sociodemographic characteristics, income, and expenditures of a nationally representative sample of households. The sample consisted of 12,850 husband-wife households, weighted to reflect the U.S. population of interest. Future estimates of childrearing expenses will be based on the 1998-2000 CE as soon as these data are available. While there may have been a change in expenditure patterns since 1990-92, these changes are not thought to be drastic.

The methodology employed by USDA in determining childrearing expenses examines the intrahousehold distribution of expenditures using data for each budgetary component. The CE contains child-specific expenditure data for some budgetary components (clothing, child care, and education) and household-level data for the other budgetary compo-

11 percent, for the middle-income group 8 percent, and for the higher income group 5 percent.

Expenditures by budgetary component differ for lower, middle, and higher income rural families (table 1 and fig. 2). As a percentage of total childrearing expenses, housing is larger for higher income rural families (33 percent) than for

lower and middle-income families (27 percent each). Food declines as a percentage of childrearing expenses across income groups—from 20 percent for lower income families to 15 percent for higher income families—but increases in dollar terms. Higher income rural families buy more expensive food and eat out more often. Transpor-

ation accounts for 17 percent of childrearing expenses for lower and middle-income families, and 15 percent (and a higher dollar amount) for higher income families. Children in higher income rural families may be taken on more trips, and teenagers in these families may have their own car.

nents (housing, food, transportation, health care, and miscellaneous goods and services). Multivariate analysis was used to estimate household and child-specific expenditures, controlling for income level, family size, age of the child, and region of residence so expenses can be determined for families with these varying characteristics. Childrearing expense estimates are provided for three income levels of husband-wife families. These income groups were determined by dividing the sample for the overall United States into equal thirds.

For each income level, the estimates are for the younger child in families with two children. The younger child is in one of six age categories: 0-2, 3-5, 6-8, 9-11, 12-14, and 15-17. Households with two children were selected as the standard because in 1990-92, this was the average household size. The focus is on the younger child in a household because the older child may be over age 17.

Estimates are based on CE interviews of households with and without specific expenses. For some families, expenditures may be higher or lower than the mean estimates, depending on whether or not they incur the expense. Child care and education are two such services. Also, the estimates cover only out-of-pocket expenditures on children made by the parents and not by others, such as grandparents or friends.

After the various overall household and child-specific expenditures were estimated, these total amounts were allocated among family members (i.e., in a married-couple, two-child family: the husband, wife, older child, and younger child). Since the expenditures for clothing, child care, and education are child-specific and thus apply only to children, allocations of these expenses were made by dividing them equally among the children. Because the CE does not collect expenditures on food and health care by family member, data from other Federal studies that show children's food and health care budget shares were used to apportion these budgetary components to a child by age.

Unlike food and health care, no authoritative base exists for allocating household expenditures on housing, transportation, and other miscellaneous goods and services among family members. Two common approaches used in allocating these expenses are the per capita method and the marginal cost method. The marginal cost method measures expenditures on children as the difference in expenses between couples with children and equivalent childless couples. Various equivalency measures have been proposed, yielding very different estimates of expenditures on children, with no standard measure accepted by economists. Also, the marginal cost approach assumes that the difference in total expenditures between couples with and without children can be attributed solely to the presence of children in a family. This assumption is questionable, especially since couples without children often buy homes larger than they need at the time of purchase in anticipation of having children. Comparing the expenditures of these couples to similar couples with children could lead to underestimates of expenditures on children.

For these reasons, USDA uses the per capita method to allocate expenses on housing, transportation, and miscellaneous goods and services among household members in equal proportions. Although the per capita method has its limitations, these limitations are considered less severe than those of the marginal cost approach. Because transportation expenses resulting from work activities are not directly related to the cost of raising a child, these expenses were excluded when determining children's transportation expenses.

Clothing and health care decline as a percentage of childrearing expenses across the three rural income groups, but increase in dollar terms. Child care/education and miscellaneous expenses account for a larger percentage of childrearing expenses for higher income rural families. As expenses on these budgetary components are

discretionary, it is not surprising that higher income families have greater expenditures.

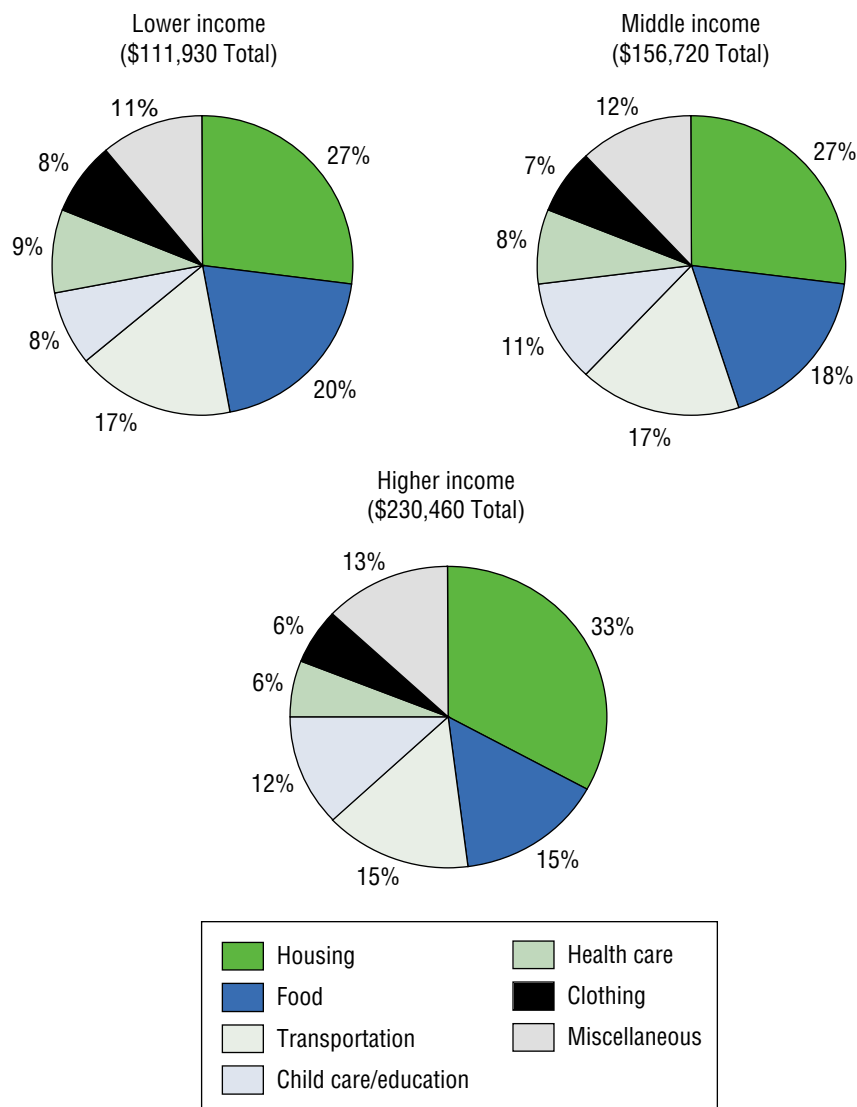
For families in both rural and urban areas, childrearing expenses steadily increase by age of the child (fig. 3). Expenses are lowest at age 2 and under and highest for teenagers (age 15-17). Food and transportation account for much of

this increase in expenses as a child ages. As a child grows older, his or her caloric needs increase. Average annual food expenses for a rural 2-year-old are \$1,010, versus \$2,000 for a rural 15-year-old. Moreover, when teenagers begin driving, auto insurance and vehicle expenses increase. Average annual transportation expenses for a rural 5-

Figure 2

Childrearing expenses of rural families, by budgetary component and income, 2000

Housing is larger percentage of total childrearing expenses for higher income rural families; food expenses decline across income groups



Source: U. S. Department of Agriculture, *Expenditures on Children by Families, 2000 Annual Report*.

year-old are \$1,250, versus \$1,950 for a rural 17-year-old.

Childrearing expenses have increased in real terms for both rural and urban families since 1960 (the first year USDA produced estimates). Real expenditures on a child up to 18 in middle-income rural families have increased 15

percent over 1960-2000 (from \$136,810 to \$156,720). In that time, housing declined from 31 to 27 percent and food declined from 23 to 18 percent of total childrearing costs. In real dollars, housing expenses have remained nearly constant and food expenses have decreased.

Health care and child care/education increased as a percentage of total childrearing costs. Health care rose from 4 to 8 percent and child care/education rose from 2 to 11 percent of childrearing expenses from 1960 to 2000 (fig. 4). The increase in health care follows the large rise in the cost of medical care over this time. The dramatic increase in child care/education expenses coincides with the increased labor force participation of mothers.

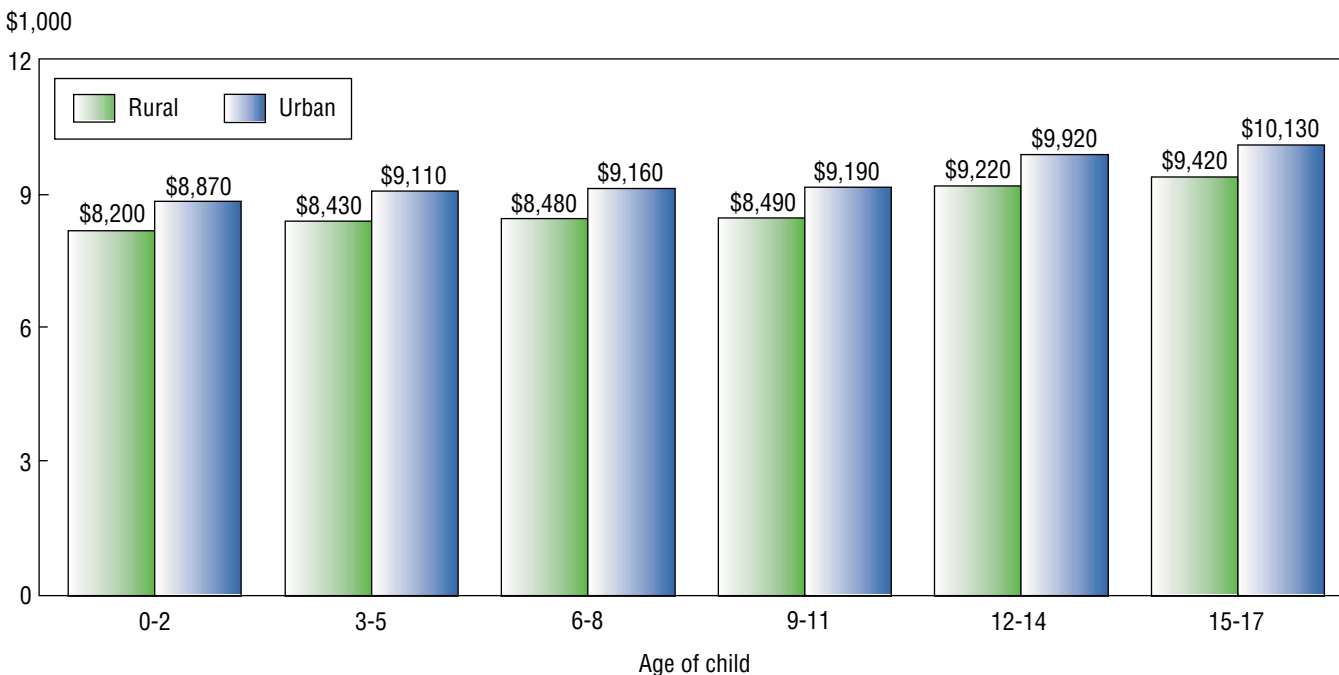
Clothing expenses decreased as a percentage share and in real terms over 1960-2000. This may seem surprising given the large selection in children's clothing today. However, expense figures examine only what the household spends on a child and not what others, such as grandparents, spend. If gifts from other people were included, real child-related clothing expenses may have increased from 1960 to 2000 because grandparents are spending more on grandchildren. Because of data limitations, clothing expenses on a child from nonhousehold members cannot be examined.

Adjustments for Older Children and Household Size

The expense estimates on a child represent expenditures on the younger child at various ages in a husband-wife household with two children. It cannot be assumed that expenses on the older child are the same at these various ages. To determine whether expenses vary by birth order, the methodology for estimating expenses on the younger child was essentially repeated using rural and urban families combined. The focus was on the older child in each of the same age categories as those used with the younger child. A two-

Figure 3
Expenditures on a child by middle-income families, by age of child and residence, 2000

Childrearing expenses steadily increased with age in both rural and urban areas



Source: U. S. Department of Agriculture, *Expenditures on Children by Families, 2000 Annual Report*.

child family was again used as the standard.

On average, for husband-wife households with two children, it was found that expenditures do not vary by birth order. Thus, annual expenditures on children in a husband-wife, two-child family may be estimated by summing the expenses for the two appropriate age categories in figure 3.

Although expenses on children were not found to vary by birth order, they differed if a household had only one child or more than two children. Families spend more or less on a child depending on the number of other children in the household. Our methodology (see “USDA Methodology for Estimating Expenditures on Children by Families”) was repeated for families with one child and families with three or more children. This again

was done for a combined sample of rural and urban families.

Compared with expenditures for each child in a husband-wife, two-child family, husband-wife households with one child spent an average of 24 percent more on the single child, and those with three or more children spent an average of 23 percent less on each child. In short, family income is spread over fewer or more children, subject to economies of scale. As families have more children, the children can share a bedroom, clothing and toys can be handed down to younger children, and food can be purchased in larger, more economical packages.

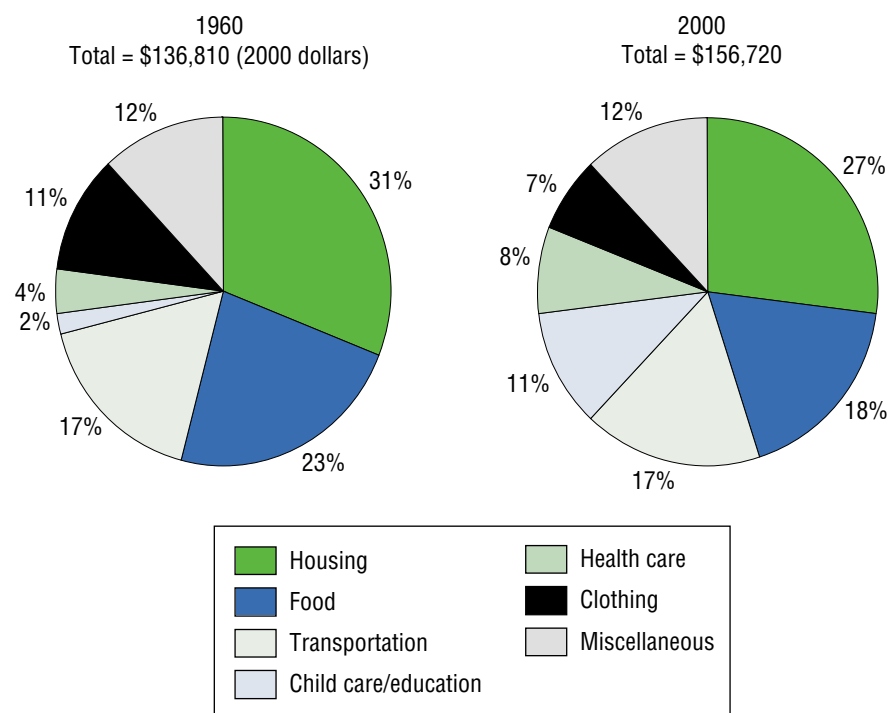
Other Expenditures on Children

Childrearing expenditures are direct parental expenses made on rural and urban children up to age

18 for 7 major budgetary components, excluding costs related to childbirth and prenatal health care. In 1996, health care costs averaged \$7,090 for a normal delivery and \$11,450 for a Caesarean delivery. Other expenditures, especially those incurred after a child turns age 18, are also excluded.

One of the largest expenses made on children after age 17 is the cost of a college education. The College Board estimated that in 2000-2001, annual average tuition and fees were \$3,420 at 4-year public colleges and \$13,688 at 4-year private colleges; annual room and board was \$4,705 at 4-year public colleges and \$5,447 at 4-year private colleges. Other parental expenses on children after age 17 could include those associated with children living at home or, if children do not live at home,

Figure 4
Expenditures on a rural child, 1960 and 2000
Childrearing expenses have increased in real terms for rural families since 1960



Source: U. S. Department of Agriculture, *Expenditures on Children by Families, 2000 Annual Report*.

gifts and other contributions to them. A 1996 survey found that 47 percent of parents in their fifties support children over 21 years of age.

The estimates do not include all government expenditures on children, such as public education, Medicaid, and subsidized school meals. Actual expenditures on children (by parents and the government), therefore, would be higher than reported here. The indirect costs of raising children—time allo-

cated to childrearing and decreased earnings—are not included in the estimates. Although these costs are more difficult to measure than direct expenditures, some studies have found them to exceed the direct costs of children.

Conclusions

Children bring many pleasures, but the fact remains that childrearing is a costly endeavor. Family expenditures on children are less in rural than urban areas for families

in similar income groups. Housing is the main reason for this. However, the gap in childrearing expense (in percentage terms) between rural and urban families declines as household income rises.

Older children are more expensive than younger children. Families do achieve a “cheaper by the dozen” effect as they have more children. The cost of two children is less than double the cost of one child.

States developing guidelines for child support and foster care payments might use the USDA childrearing expense estimates as a base. If so, States need to keep in mind the difference in childrearing expense between rural and urban areas. A primarily rural State may want to work from the cost of raising a child in rural areas. If a State is both urban and rural, it may want to use an average of the cost of raising a child in the two areas. Likewise, when States are developing child support guidelines and foster care payments, they need to recognize the difference in childrearing expenses by age of the child and number of children in the family.

Future estimates of childrearing expenses will be based on 1998-2000 data as soon as these data are available. Given the increasing percentage of mothers in the labor force and the growing burden of health care costs on households, expenses on children are likely rising. **RA**

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U.S. Economy in Recovery, Although Rural Areas Still Affected by Recession

David A. Torgerson
Karen S. Hamrick

The longest U.S. economic expansion on record ended in 2001, and rural areas were disproportionately affected even as the recovery began. The recession began in March 2001 despite a proactive loosening of monetary policy beginning in January 2001. Although the National Bureau of Economic Research has not yet declared the recession over, most forecasters think that by late February 2002, the recovery had begun.

Investment Spending Spurs Productivity Growth

The business fixed-investment boom of 1995-2000, concentrated in the high-tech computing and telecommunications sectors, was unsustainable. Five years of Gross Domestic Product (GDP) growth at more than 4 percent annually, above long-term growth potential, had been stimulated by the double-digit spending growth in business equipment, particularly in computers and software. However, spend-

ing on capital equipment stalled in the fourth quarter of 2000, presaging the impending drop in GDP.

The major funding sources of plant and equipment spending are new corporate equities, retained earnings, new corporate bonds, and bank lending. All of these funding sources were plentiful during the investment-spending boom of 1995-2000. With the stock market rising rapidly, a company issuing new stock was able to do so under very favorable terms. Financing through new stock issues was very cheap for dot-com startups as well as old blue chip corporations. Retained earnings were growing, as the investment proved profitable. The banking system provided the financing for small businesses to modernize by upgrading computer equipment. Each year's profits increased through the cost savings from the prior year's capital improvement, making bank loans available at favorable rates. More conservative companies joined the new equipment bandwagon. As a result, business equipment and software spending grew at above 11 percent per year in every year from 1993 to 2000—the longest streak of equipment spending growth since World War II.

Manufacturing in Recession Since Late 2000

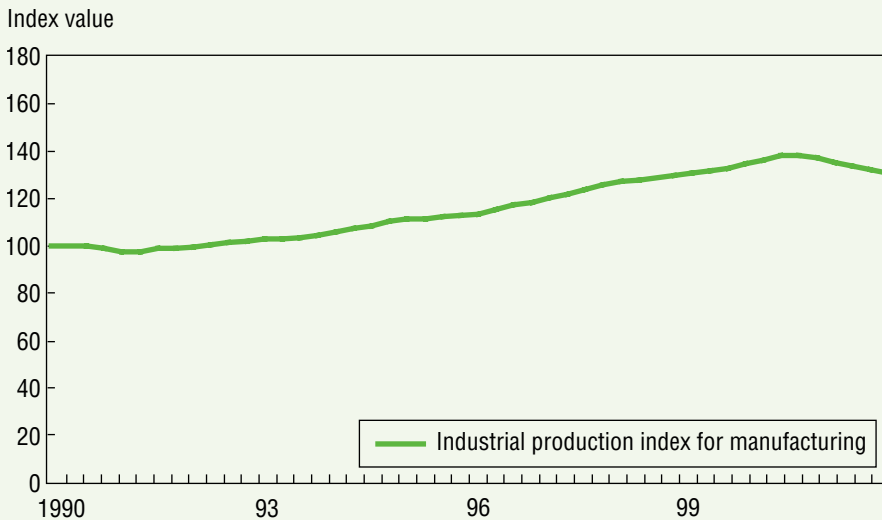
The increasing capacity in high technology generated lower product prices and large cost savings, as embodied in the strong productivity growth throughout the 1990s

expansion. The capacity to absorb new technology was eventually reached and worldwide demand matured, resulting in lower corporate earnings. Although the bull market in technology stocks collapsed in March 2000, the equipment investment boom, fueled by initial public offerings, continued into early 2001. At the same time, credit conditions tightened and medium and small businesses struggled to obtain credit. The recession in business fixed investment and manufacturing began in the late summer of 2000, triggered by a decline in earnings and credit availability. Since nonmetro areas have a larger share of small businesses than metro areas, they were more likely affected by these tightened credit conditions.

The manufacturing recession had spread to the rest of the economy by March of 2001. The industrial production index—a broad-gauge index of output from U.S. factories, mines, and gas and electric utilities—fell for six quarters in a row for the first time since the Great Depression (fig. 1). This industrial decline, starting in the third quarter of 2000 and continuing through 2001, was concentrated in the high-tech sector as business computer equipment production dropped 10 percent in September 2001 from its peak in November 2000. Manufacturing employment declined 7.2 percent from spring 2000 to the end of 2001, a loss of 1.3 million jobs (fig. 2).

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Figure 1
Industrial production index for manufacturing, 1990-2001
Index peaked in the third quarter of 2000



Source: Federal Reserve Board.

Asian Economic Slowdown Drives Dollar Up

The concentration of the manufacturing recession in the technology sector contributed to a sharp slowdown in the economies of Asia, and particularly East Asia. Japan's recession of 2001, coupled with the slowdown in U.S. computer equipment demand, affected Asia nearly as much as the 1997-98 Asian financial crisis. Exports to Asia in goods, such as machine tools, dropped. U.S. machine tool production dropped in early 2001 to less than half the production level a year before. Many analysts expect the current Asian economic slowdown to be more protracted than in 1997-98.

A strong dollar exacerbated the recession in goods production. The dollar had been expected to fall in value versus the yen and European monetary unit (EMU) during 2001, but it appreciated instead. Japan, which had been expected to recover in 2001, went into a full-fledged recession, causing the yen to fall in

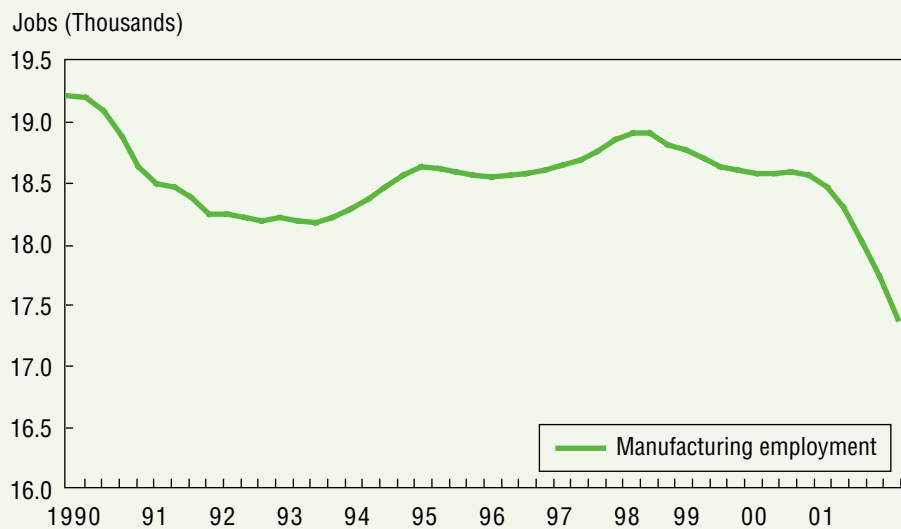
value relative to the dollar. Similarly, when European Union growth fell below expectations, the EMU declined in value. The net result was a 5-percent appreciation of the dollar in the exact opposite

direction needed to lower the more than \$500-billion U.S. trade deficit. As a consequence, real goods exports dropped \$122 billion in the fourth quarter of 2001 from a peak of \$865 billion in the third quarter of 2000. As employment in non-metro areas is more export dependent, the decline in goods exports likely has had a greater impact on rural economies. Since exchange rate movements take several quarters to fully make their impact, nonmetro employment will likely be affected by these developments into 2002.

Strong Consumer Spending Postponed Start of Recession

Robust consumer spending kept the U.S. economy out of recession despite the weak industrial sector through early 2001. Continuous housing appreciation and rising real wages drove this spending. Growth in real compensation, even as job growth slowed,

Figure 2
Manufacturing jobs, 1990-2001
Over 1.5 million manufacturing jobs have been lost since 1998

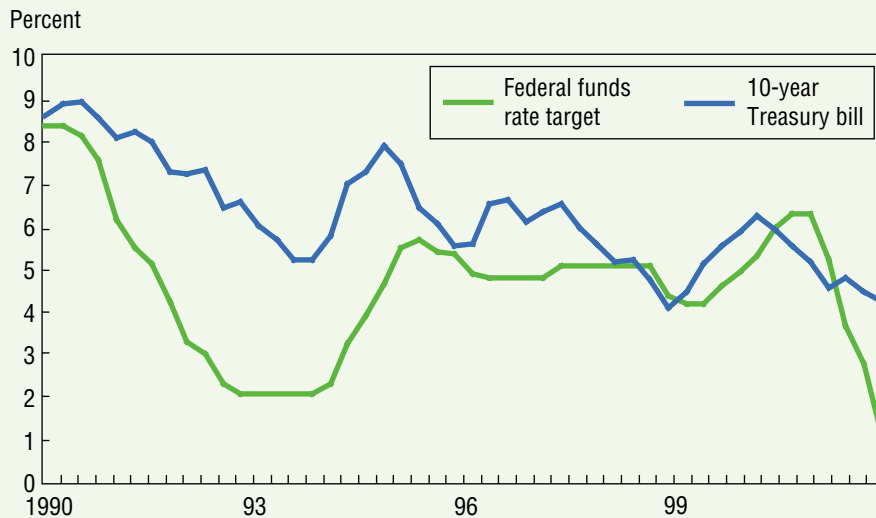


Source: Bureau of Labor Statistics.

Figure 3

Monetary policy over 1990-2001

Treasury bill rates tend to fall as the Federal Reserve lowers the Federal funds rate



Source: Federal Reserve Board.

further boosted consumer spending through the first half of 2001.

Real estate price escalation allowed the richest households to fund spending in excess of household income, taking on more real estate debt even as stock values plummeted. The weakened stock market reduced household financial wealth in 2000 but was partly offset by rising real estate values. The wealthiest 10 percent of households increased their spending by more than their personal income grew, mainly by refinancing their mortgages. Less wealthy consumers also spent freely into early 2001 as real wages continued rising in the tight labor market. The strength in consumer household income and balance sheets also supported home sales and housing starts during this period. As usual, consumer services spending rose with rising personal income.

The Bursting Bubble

The bubble burst in three stages. First, in March 2000, the U.S. equities began their bear market in the NASDAQ, the stock market where most technology stocks trade. The bear market erupted in fall 2001 when the Dow Jones Industrial index fell more than 35 percent from its peak value of 11,582.4 in January 13, 2000.

Second, in late 2000 the manufacturing recession worsened. Layoffs made it harder to get jobs, especially in geographically concentrated industries. As manufacturing profits and capital exports to Asia fell, production dropped. In addition, increased goods imports due to the dollar's strength weakened demand for domestically produced goods.

Finally, the manufacturing and stock market recession spread to the rest of the economy. By March

2001, the large wave of manufacturing layoffs and world events hurt consumer confidence. Weakened consumer confidence, coupled with slowed growth in wage earnings, brought consumer spending growth to a crawl. As real estate appreciation slowed and stock market values stagnated, spending on housing and luxury goods declined as well. Services spending was stagnant as well.

Aggressive lowering of short-term interest rates could not overcome slumping business plant and equipment prospects from lower earnings and declining availability of investment funds, nor did it buoy sluggish retail sales. Normally, a sharp drop in short-term interest rates generates a noticeable drop in long-term interest rates. But, as of October 2001, a 400-basis-point drop in the Federal funds rate (the rate at which banks lend each other money to cover reserve requirements) translated to a meager 66-basis-point drop in the 10-year Treasury note rate. (fig. 3).

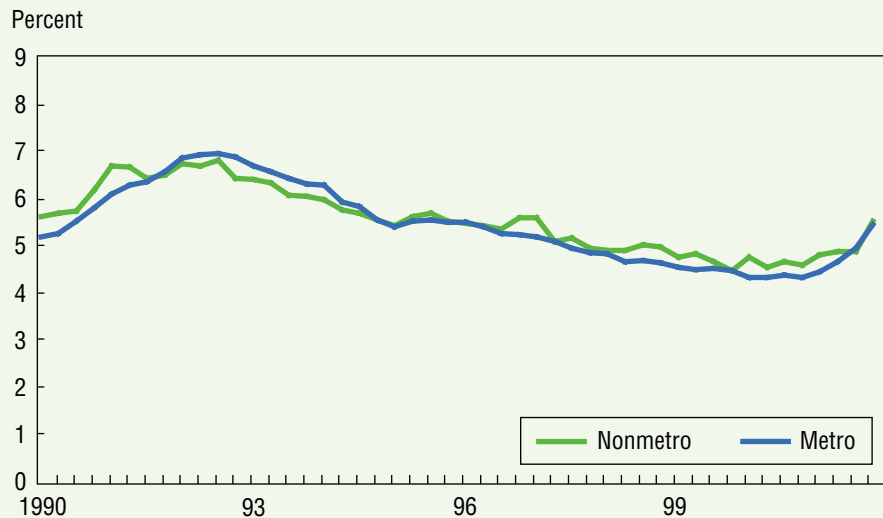
As a result of these events, GDP growth in the last half of 2001 was soft. Despite the recent weakened state of the economy, there were several mitigating factors. Interest rates and inflation were both low and likely to fall. Also, oil (fig. 4) and commodity prices had fallen from the very high levels seen in 2000 (however, with the world economic recovery in 2002, crude oil and gasoline prices are rising sharply.) Natural gas prices, which had risen higher than oil prices in 2000, are likely to rise less sharply than oil prices through 2002, aiding the recovery. These factors have

mitigated the recession's impact on household income and helped spur spending growth in early 2002, helping the economic recovery. A bright spot even during the recession was the continued increase in productivity, which historically falls during a recession. This will likely provide the wherewithal for higher wages and corporate profits by late 2002.

Outlook for 2002

Although the economy appears to be in recovery, three impediments loom. First, employment is likely to grow slowly until late 2002. Because the labor market lags the rest of the economy in recovery, relatively high rates of unemployment are expected for at least several quarters. Employers are reluctant to hire new employees until they are confident that the recovery will last. Second, corporate profitability is likely to stay weak for 2002 as a whole. The weak corporate balance sheet will

Figure 5
Nonmetro and metro unemployment rates
Unemployment rates rose sharply in 2001



Source: ERS calculations from Bureau of Labor Statistics Current Population Survey data.

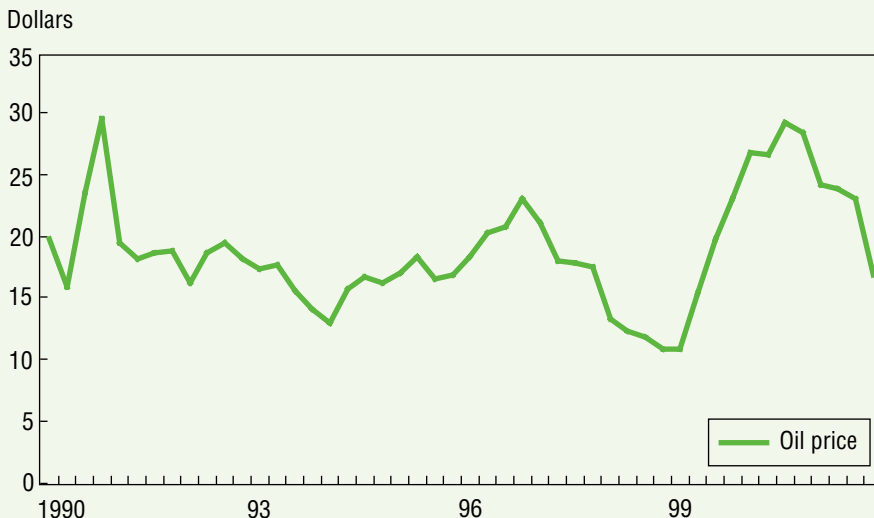
likely lead to more layoffs from company downsizings and reorganizations at least for the first half of 2002. Also, weak corporate profits will affect household wealth, as the stock market will likely stagnate

until earnings rise in late 2002. Last, petroleum prices are expected to rise sharply over the next year, reducing spending on non-energy household goods and services and dampening the strength of the recovery for the first half of 2002.

Household income and wealth are expected to show strength in early 2003 as the economic recovery picks up steam.

Figure 4
Oil prices, 1990-2001

Oil prices dropped from their recent heights



Source: U.S. Department of Energy.

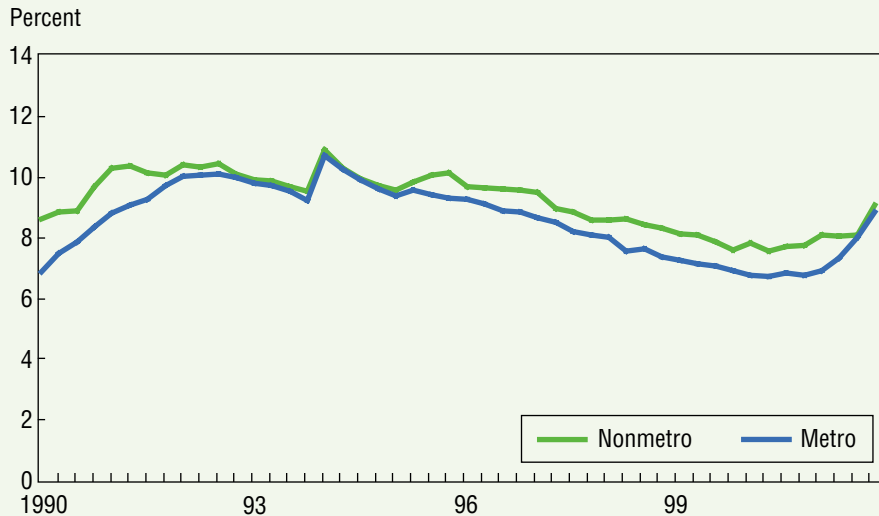
Implications for the Rural Economy

The steadily worsening manufacturing recession over 2000-2001, exacerbated by a decline in the overall economy, caused disproportionate job losses in nonmetro counties. Nonmetro areas had already been experiencing unemployment rates higher than those in metro areas since 1995 (fig. 5). Over 2000-01, nonmetro employment declined by 600,000 workers, while metro areas gained about the same number. An easy explanation of these events would be that the 600,000 nonmetro workers moved

Figure 6

Nonmetro and metro adjusted unemployment rates

The nonmetro adjusted rate continues to be above the metro rate



Source: ERS calculations from Bureau of Labor Statistics Current Population Survey data.

to metro areas and obtained jobs there. However, the nonmetro labor force stayed about the same while the metro labor force grew. This indicates that the 600,000 workers who lost their jobs in nonmetro areas either became unemployed or dropped out of the labor force. That the unemployment rates for the two areas ended 2001 at about the same rate, 5.6 percent for nonmetro versus 5.5 percent for metro, masks the change in the relative employment situation.

Similarly, the adjusted unemployment rate—a more comprehensive measure of labor market slackness that includes those working part time who would rather work full time, and also those who desire work but believe that no jobs are available and so have stopped job hunting—was about the same for both metro (9.3 percent) and nonmetro (9.6 percent). However, nonmetro areas had a high adjusted unemployment rate over all of 2000-01 (fig. 6), indicating labor

market slackness due to more than just the recession.

Increases in compensation—wages and salaries plus benefits—ended 2001 with nonmetro areas experiencing only a 3.5-percent increase in the final quarter versus

4.2 percent for metro (fig. 7). However, over the last 2 years, the cumulative increase in compensation was 11.0 percent for nonmetro workers and only 10.5 percent for metro workers. Over 1990-2001, the cumulative increases were about the same.

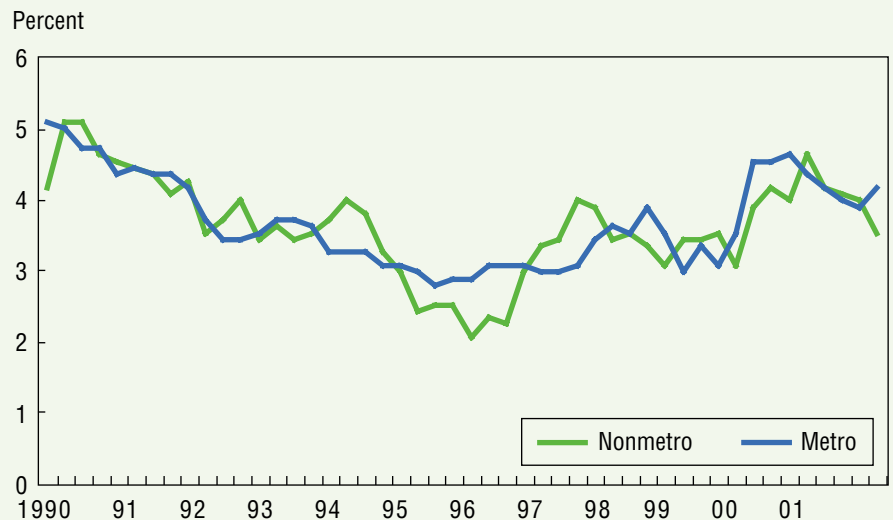
Farm households have seen farm income suffer from low commodity prices due to slow world growth and a strong dollar. In addition, as these international factors have weakened the manufacturing sector, it has become harder for farm families to keep off-farm jobs.

The weak U.S. economy and the softening of trade partners' income is expected to affect nonmetro areas disproportionately. First, rural areas are more export-dependent than urban areas and thus would be more hurt by the expected stagnation in goods exports. Second, softening consumer demand has affected the textile and apparel industries in particular, and production has declined 20 percent over the last 2

Figure 7

Nonmetro and metro employment cost index, total compensation

Nonmetro compensation gains lagged metro gains over 2000-2001



Source: Bureau of Labor Statistics.



Photo courtesy, Economic Research Service, USDA.

years. These industries had already suffered extensive layoffs over the 1990s. Since textile/apparel plants are concentrated in nonmetro counties of the Southeast, rural labor markets there could be hard pressed to absorb workers.

Other areas hurt by layoffs over the past several years are the Pacific Northwest and the North Atlantic States. Layoffs in the

Pacific Northwest were mostly in the lumber and wood products industries, plus some in the electric industry. The North Atlantic States had a mixed group of industries with layoffs—the electric industry and various manufacturing industries, including textiles/apparel, leather/leather goods, toys, paper products, metal products, machinery, and electrical equipment.

Smaller areas that have experienced high concentrations of layoffs are New Mexico/Texas, Kansas, and North Dakota/Montana, all in mining or mining-related industries. The recovery's soft labor market is likely to affect these areas especially, as they saw so many layoffs during the 1990s expansion. *[Data as of April 4, 2002.]* [RA](#)

Rural Employment Turned Down in 2001 As Unemployment Continued to Climb

Lorin Kusmin

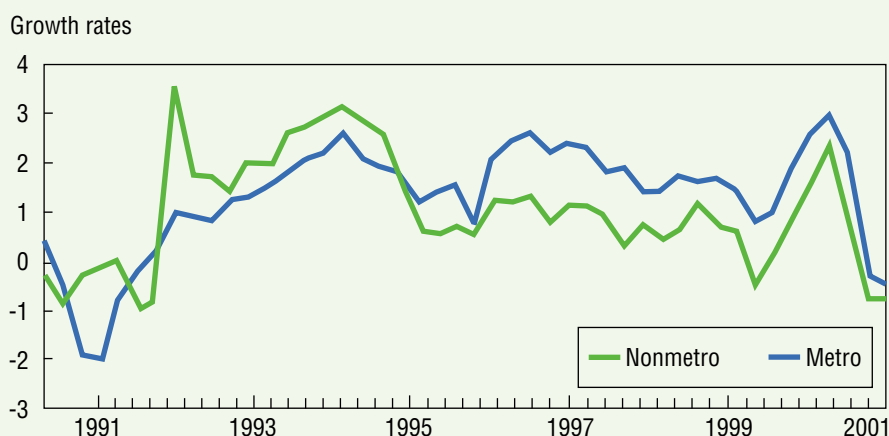
After substantial growth in 2000, rural employment growth slowed sharply in the first quarter of 2001, and turned negative in the second quarter of 2001 (fig. 1). Rural employment growth had been positive for nearly 10 years (except for the fourth quarter of 1999), dating back to the third quarter of 1991. Urban employment growth, which had been more rapid, also turned negative in the second quarter of 2001. Overall, urban employment grew more than 10 percent in the 6 years ending in the third quarter of 2001, while rural employment grew about 4 percent.

After the rural unemployment rate reached its lowest level in decades in the fourth quarter of 1999, it increased somewhat during 2000, and has increased further in 2001 (fig. 2). The urban unemployment rate fell to its lowest level in 2000 and edged up during the first two quarters in 2001 before jump-

ing more sharply in the third quarter. Overall, rural unemployment rates had risen 0.6 percentage point and urban unemployment rates had risen 0.9 percentage point from their lowest levels by the third quarter of 2001. This is a modest increase compared with that seen in the last major economic slowdown, the recession of 1990-91. In general, urban and rural unemployment rates have been similar and have moved together over the past decade, although urban areas saw a sharper rise in unemployment during the recession of 1990-91 and a more gradual decline in unemployment after that recession.

Using the Local Area Unemployment Statistics (LBS) for greater geographic detail, rural unemployment rates during the 1990s have generally been highest in the West and lowest in the Midwest (fig. 3). While nonmetro unemployment has declined in all regions, the decline has been sharpest in the Northeast, where unemployment peaked at 8.4 percent in 1992 and fell to 4.4 percent in 2000. The smallest proportionate decline was in the West, where unemployment peaked at 9.3 percent in 1992 and fell to 6.3 percent by 2000.

Figure 1
Employment growth rate in metro and nonmetro areas
Metro employment growth has outpaced nonmetro growth since 1995



Source: Bureau of Labor Statistics, Local Area Unemployment Statistics, seasonally adjusted by ERS.

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Table 1

Employment growth in nonmetro areas by region and economic type, 2nd quarter 1991-2nd quarter 2001

Nonmetro employment grew in all regions and across most county economic types during the past decade, with the fastest growth in the West and in services counties

Region/type	Annual growth rate
	Percent
Northeast	0.3
Midwest	1.0
South	0.8
West	1.6
Agriculture	0.6
Mining	-0.1
Manufacturing	0.8
Government	1.2
Services	1.3
Nonspecialized	1.0

Source: Bureau of Labor Statistics, Local Area Unemployment Statistics.

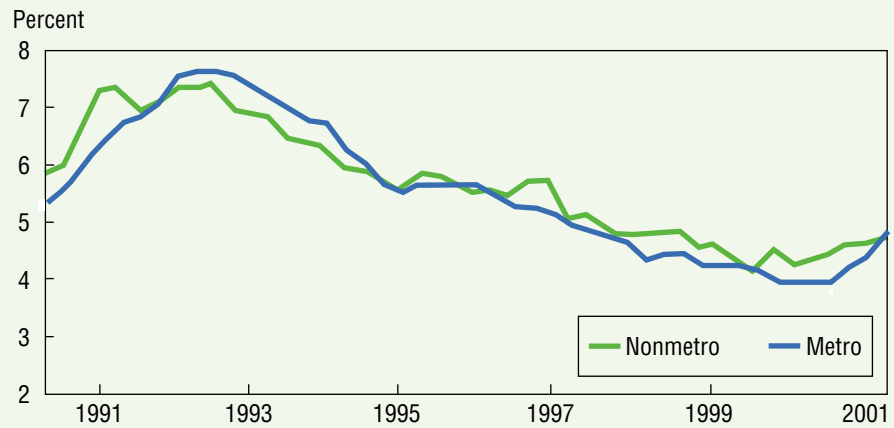
Nonmetro unemployment has generally been highest in mining counties and lowest in services counties throughout the past decade (fig. 4). Manufacturing, government, and nonspecialized counties have had moderate unemployment. Farming counties did not suffer disproportionately during the recession of the early 1990s, but unemployment rates in those counties have fallen less rapidly than in the other economic base categories.

Over the last decade, despite persistently high unemployment, rural employment growth has generally been fastest in the West (table 1). Rural employment has grown more rapidly in government, services, and nonspecialized counties than in mining and farming counties. *RA*

Figure 2

Metro and nonmetro unemployment rate

In recent years, nonmetro unemployment rates have been slightly higher than metro rates

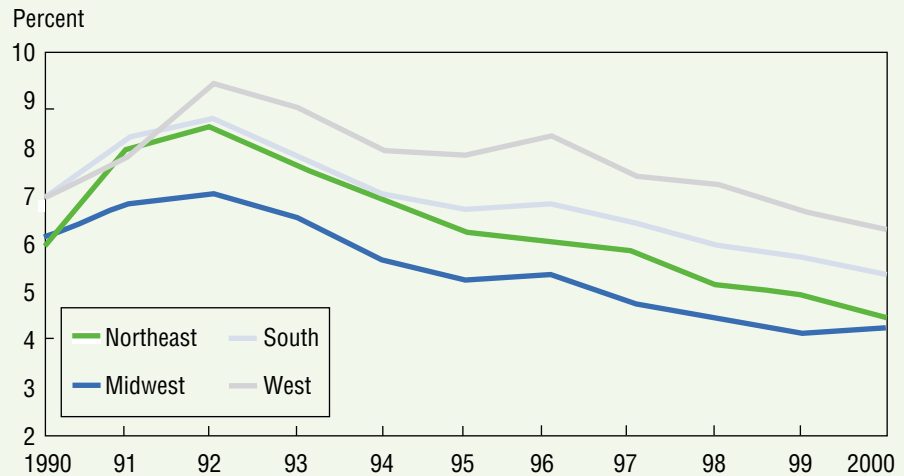


Source: Current Population Survey, seasonally adjusted by ERS.

Figure 3

Nonmetro unemployment rate by region

Since 1992, nonmetro unemployment has been highest in the West

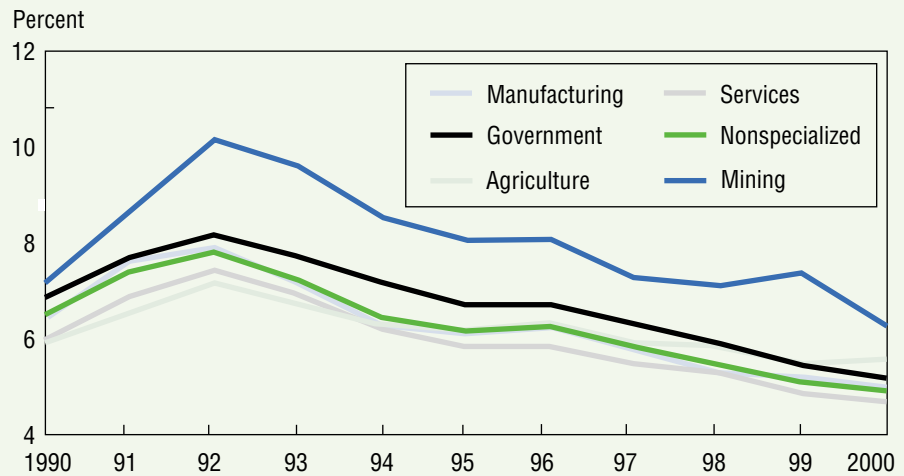


Source: Bureau of Labor Statistics, Local Area Unemployment Statistics.

Figure 4

Nonmetro unemployment rate by economic type

Mining counties have experienced higher unemployment rates than other county economic types throughout the 1990s



Source: Bureau of Labor Statistics, Local Area Unemployment Statistics.

Food and Fiber System Important Part of Economy

William Edmondson

The food and fiber system's (FFS) share of total gross domestic product (GDP) was 12.8 percent in 2000 (table 1). Actual levels of employment and GDP increased in almost every year since 1991, though shares have mostly dropped. In 1991, the FFS share of GDP was 14.8 percent. Growing output (in dollars) and employment (in jobs) reflect a move by both domestic and foreign consumers away from low-value bulk commodities toward more high-value processed products.

Still, employment generated by the FFS has trended downward from 18.5 percent of the U.S. total in 1991 to 17.1 percent in 2000. High labor productivity in the farm sector coupled with stable demand for agricultural and food products (compared with an expansive non-farm economy) produced a diminishing relative share of total employment and GDP.

The food and fiber system as a whole added \$1.26 trillion to U.S. GDP in 2000. Of this, \$757 billion came from manufacturing and distribution, while \$426 billion came from inputs (table 2). The farm

sector by itself accounted for \$82 billion, a \$15-billion increase over 1999.

Food and fiber industries generate benefits to the economy in different ways, exhibiting wide differences between contributions to GDP and share of employment. In some industries—mining, food processing, and tobacco, for example—the share contributed to GDP was more than twice the share of employment. By contrast, the relatively low-wage, labor-intensive foodservice sector's job share was more than twice its value-added share.

These estimates were derived using a much more industry-specific and precise measure of implicit price deflators than those that appeared in previous editions of *Rural America*. These deflators allow a true measure of value generated in an industry versus that which may be due solely to price inflation. While the job and employment estimates of the FFS remain the same, GDP dropped significantly from 1999's estimate of \$1.521 trillion of FFS GDP (*Rural America*, Vol. 16, No. 1), because of the switch in methodological tools.

The food and fiber system comprises the producers of goods and services required to assemble, process, and distribute raw farm products to U.S. and foreign consumers. Food and fiber system employment estimates are developed using a national input-output model that describes input use and factor payments for each sector of the economy. The model is used to estimate the amount of employment in each sector needed to support the final demands for agricultural products. Thus, this measure may include jobs in all sectors of the economy, even those where the link to agriculture is weak. Unlike the farm-related employment measure, food and fiber sector estimates do not count all jobs in a particular sector; only the jobs needed to support demand for agricultural products are counted. Food and fiber sector estimates are closely aligned with the U.S. Department of Commerce's National Income and Product Accounts. [RA](#)

Table 1

Key statistical indicators of the food and fiber system

Measure/Industry	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<i>Billion dollars</i>										
GDP:										
Farm	69.3	75.5	70.2	77.8	73.5	85.7	82.6	74.0	66.9	82.0
Food processing	109.7	112.9	114.5	123.4	116.6	124.7	134.2	146.1	155.9	165.2
Textiles	25.2	25.9	27.1	28.2	28.4	31.2	30.2	31.2	34.5	34.2
Other manufacturing	105.6	109.4	109.8	115.4	112.7	111.2	109.0	106.4	104.6	110.4
Services	190.7	205.5	216.9	234.6	246.6	258.5	272.9	293.4	316.0	335.7
Trade	241.3	247.2	260.3	279.1	294.2	293.4	295.6	299.7	314.9	337.7
Transportation	30.4	30.8	32.2	33.2	35.1	33.5	35.8	39.2	40.5	42.9
Eating places	115.0	117.6	126.5	134.9	141.1	140.2	141.7	142.8	147.2	156.4
Total FFS	887.2	924.8	957.6	1,026.6	1,048.2	1,078.5	1,101.9	1,132.7	1,180.6	1,264.5
Percent of U.S. GDP	14.8	14.6	14.4	14.6	14.2	13.8	13.2	12.9	12.7	12.8
Total U.S. GDP ¹	5,986.2	6,318.9	6,642.3	7,054.3	7,400.5	7,813.2	8,318.4	8,781.5	9,268.6	9,872.9
<i>Million jobs</i>										
Employment:										
Farm	2.0	1.9	1.8	1.9	2.0	2.0	1.9	1.8	1.8	1.7
Food processing	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3
Textiles	1.1	1.0	1.0	1.0	1.0	1.1	1.0	0.9	1.0	0.9
Other manufacturing	1.5	1.5	1.4	1.5	1.4	1.4	1.3	1.3	1.3	1.2
Services	3.3	3.3	3.4	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Trade	7.3	7.3	7.5	7.7	7.9	7.9	7.9	8.1	8.3	8.4
Transportation	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Eating places	6.0	6.0	6.3	6.4	6.5	6.5	6.5	6.6	6.6	6.6
Total FFS	23.4	23.1	23.5	24.1	24.5	24.2	24.1	24.2	24.4	24.1
Percent of U.S. employment	18.5	18.0	18.2	18.4	18.5	18.1	17.7	17.5	17.5	17.1
U.S. civilian labor force ²	126.3	128.1	129.2	131.1	132.3	133.9	136.3	137.7	139.4	140.9

¹U.S. Department of Commerce. Value-added data presented here are consistent with U.S. Department of Commerce, National Income and Products Accounts, accounting conventions.

²U.S. Department of Labor, Bureau of Labor Statistics.

Table 2

Contribution of the food and fiber system to the U.S. economy, 2000

Industry	Value added to GDP	Share of FFS contribution to GDP	Share of GDP	Number of workers	Share of FFS employment	Share of total U.S. employment
	<i>Billion dollars</i>	<i>Percent</i>		<i>Thousands</i>		<i>Percent</i>
Farming	82.0	6.5	0.8	1,716	7.1	1.2
Total inputs	426.0	33.7	4.3	4,696	19.4	3.3
Mining	17.0	1.3	0.2	61	0.3	--
Forestry, fishing, and agricultural services	14.5	1.1	0.2	414	1.7	0.3
Manufacturing	90.0	7.1	0.9	1,177	4.9	0.9
Services	304.2	24.1	3.1	3,044	12.6	2.2
Total manufacturing and distribution	757.0	59.9	7.7	17,738	73.5	12.6
Manufacturing:						
Food processing	165.2	13.1	1.7	1,306	5.4	0.9
Textiles	34.2	2.7	0.3	880	3.6	0.6
Leather	0.1	--	--	2	--	--
Tobacco	20.0	1.6	0.2	30	0.1	--
Distribution:						
Transportation	42.9	3.4	0.4	597	2.5	0.4
Wholesaling and retailing	337.7	26.7	3.4	8,352	34.6	5.9
Foodservice	156.4	12.4	1.6	6,567	27.2	4.7
Total food and fiber system	1,264.5	100.0	12.8	24,145	100.0	17.1

-- = less than .05 percent.

Source: Calculated by ERS using data from the U.S. Departments of Commerce and Labor.

Food and Agricultural Exports Increased in 2000 at a Greater Rate Than Imports, Reversing 5-Year Trend

William Edmondson

Exports make an important contribution to the farm sector and to the U.S. economy as a whole. In 2000, the United States exported \$51.6 billion of agricultural products, up from \$48.3 billion in 1999. Exports of agricultural commodities increased to \$52.7 billion during fiscal year 2001.

The increase in dollar value of exports was due to higher prices for some bulk commodities (wheat, sorghum, soybeans, tobacco, and cotton) and increased global demand—after years of sluggishness—by the stronger economies in Asia, Russia, and Latin America. The U.S. dollar is still strong.

Agricultural exports are vital to the U.S. economy, supporting jobs on farms and in food processing, other manufacturing plants, and the transportation and trade sectors. Agricultural exports generated an estimated 740,000 jobs in 2000, of which 296,000 were on farms. The impact of agricultural exports on the U.S. economy is far-reaching. Every dollar of exports generated an additional \$1.47 in economic activity in supporting sectors (table 1).

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Imports of agricultural products were worth \$39.0 billion in 2000, up from \$37.9 billion in 1999. Agricultural imports are forecast to hold steady in fiscal year 2001 at \$39 billion. Since agricultural exports exceeded imports, the United States had a positive trade balance in agricultural products of \$12.6 billion in 2000, an increase over 1999's \$10.4 billion and the first year-to-year increase since 1996. The trade balance rose in 2000 as agricultural exports increased by \$3.3 billion and imports by \$1.1 billion over 1999. An even greater positive agricultural trade balance is forecast for 2001.

About \$8 billion of the 2000 imports were such commodities as bananas, coffee, and tea that do not compete with U.S. products. The remaining \$31.2 billion of imports—such as meat, dairy products, fruits, nuts, vegetables, sugar, and wines—do compete with U.S. products. The United States imported more processed or high-value foods—such as sausages, cheeses, confectionery goods, and wines—than it exported in 2000, resulting in a negative trade balance in nonbulk commodities.

Exports of processed agricultural products have more extensive impacts on the U.S. economy than exports of bulk commodities. Nonbulk products account for most of the economic activity generated by agricultural exports. In 2000, they accounted for 420,000 of the 740,000 jobs attributed to agricultural exports. Each dollar of non-

bulk agricultural exports (fresh fruits and vegetables and "value-added" processed products) generated an additional \$1.63 in supporting activity, compared with \$1.18 for each dollar of bulk exports (grains, oilseeds, and cotton). Bulk exports, however, generated more U.S. jobs per \$1 billion of exported commodity than did processed exports because of the high volume and relatively low prices of bulk goods over the past 3 years. In 2000, \$1 billion of bulk exports supported 17,200 U.S. jobs, compared with 12,700 for nonbulk exports. An unusual occurrence of volume and prices combined in 2000 for this anomaly—bulk goods adding more jobs—to take place.

Economic Impacts of Food Trade

U.S. agricultural trade includes many commodities not meant for human consumption, including hides and skins, pharmaceutical products, toiletries, resins, and food processing byproducts. Many requests to ERS are concerned with the impacts of trade in products meant strictly for human consumption, or "edible food." While a true "food only" definition of trade may never be reached, ERS researchers have identified a commodity basket of goods that best reflects this objective. For example, oats can be used as both an animal feed and a breakfast cereal. Some items not usually readily consumed in the United States require little additional processing in the importing countries. Pet foods are included

in both food and agricultural export totals. Total food exports in 2000 were \$47.1 billion, versus \$51.6 billion of total agricultural exports (table 1).

Total food exports contain \$14.6 billion of bulk exports (compared with \$18.6 billion in the agricultural total) and \$29.3 billion of nonbulk commodities (versus \$33 billion in the agricultural total). The difference between these numbers represents what ERS feels are inedible, nonfood items. Unique to the food trade aggregation (i.e., not counted in the agricultural exports) is the addition of fresh, frozen, and canned seafood and distilled liquors, worth \$3.2 billion.

Each dollar of food exports in 2000 stimulated another \$1.46 in supporting activities to produce and deliver these exports. Thus, the \$47.1 billion of food exports in 2000 stimulated an additional \$68.9 billion in supporting activities for a total of \$116.0 billion in business activity. Food exports generated an estimated 697,000 full-time civilian jobs, including 441,000 nonfarm jobs. Net food exports, which were not split into bulk and nonbulk for this analysis, contributed \$3.8 billion to the U.S. trade balance, compared with the \$12.6-billion trade surplus generated by all agricultural exports in 2000.

Of the \$47.1 billion of food products exported in 2000, the value of exported raw products was \$14.6 billion; processed commodities, \$23.8 billion; and transportation and trade services for raw and processed products, \$8.6 billion. There are more processed food commodities included in the direct exports of food than of agricultural exports—\$23.6 billion versus \$22.5 billion—because of the addition of fish and distilled spirits to the food

totals. The \$68.9 billion in food trade supporting activity included \$12.1 billion from the farm sector, \$5.2 billion from the food processing sector, \$15.0 billion from manufacturing sectors other than food processing, \$11.9 billion from trade and transportation, and \$24.6 billion from services other than trade and transportation. Nonfarm sectors of the economy received about 82 percent of the additional economic activity.

Almost 700,000 full-time jobs were required to support food exports, 256,000 U.S. farmworkers (or 9 percent of the farm labor force) and 441,000 nonfarm workers. About 79,000 jobs were in food processing, 131,000 in trade and transportation, 55,000 in other manufacturing sectors, and 176,000 in other services (table 1). Farm jobs suffer most by comparison with jobs generated by all agricultural exports. The addition of seafood and distillery products in the food total does little to generate farm jobs.

Effect of Food Imports on U.S. Output

The United States imported \$43.3 billion in food commodities that competes with U.S. products in 2000 (versus \$31.2 billion of competitive agricultural imports). The \$7.8 billion of complementary agricultural trade that does not compete with U.S. production contains items that may or may not be considered food.

The direct food import basket contains \$800 million of bulk products, \$31.7 billion of nonbulk products, and \$10.8 billion of seafood and distilled products. The equivalent domestic output effect of the \$43.3 billion of competitive food imports is an estimated \$102.6 billion. Each dollar spent on these

imports would have required another \$1.37 in supporting goods and services if those imported items had been produced domestically. Thus, the U.S. net business surplus for food trade in 2000 was an estimated \$13.4 billion, \$116.0 billion of total output generated by food exports minus \$102.6 billion in stimulation forgone by food imports.

U.S. food trade benefits most sectors of the economy. The farm sector's \$26.7 billion of output associated with food exports almost doubles the \$15.1 billion of farm output implicitly lost because of competitive food imports. Manufacturing sectors, including food processing, gave up \$8.2 billion in total output, about 26,000 jobs, and \$3.2 billion in income implicitly lost to food imports. Outside of farming and food processing, the U.S. directly accrued a net \$0.9 billion from food trade. Food processing alone lost \$6.4 billion in direct trade and another \$6.1 billion in additional output. (These losses represent economic activity that could have been captured domestically had the imports been manufactured in the U.S. As such, they are hypothetical. This analysis does not capture the added activity that is generated by imports if they are used as an intermediate ingredient in the production of other food products.)

In 2000, the nonfarm share of total income attributed to food exports and food imports was 78 percent and 88 percent, respectively, with nonfarm, nonfood sectors of the economy receiving 64 percent of income from both food exports and imports. The farm sector received 22 percent of the total income from food exports, while the food processing sector received 14 percent, reflecting the impor-

Table 1

U.S. economic activity triggered by agricultural and food trade

Item	1999	Agricultural trade, 2000			Food trade
	Total	Total	Bulk	Other	2000
<i>Billion dollars</i>					
Economic activity generated by exports	115.6	127.3	40.6	86.7	116.0
Exports	48.3	51.6	18.6	33.0	47.1
Imports	37.9	39.0	1.5	37.5	43.3
Complementary	8.0	7.8	0.0	7.8	0.0
Competitive	29.9	31.2	1.5	29.7	43.3
Trade balance	10.4	12.6	17.1	-4.5	3.8
Supporting activities	67.3	75.7	22.0	53.7	68.9
Farm	12.8	14.3	0.8	13.5	12.1
Food processing	5.1	5.5	0.1	5.4	5.2
Other manufacturing	15.0	16.7	6.1	10.1	15.0
Trade and transportation	11.7	12.8	3.9	8.9	11.9
Other services	22.7	26.4	11.1	15.3	24.6
<i>Percent</i>					
Nonfarm share of supporting economic activity	81	81	96	75	82
<i>Multiplier</i>					
Export multiplier (additional business activity generated by \$1 of exports)	1.39	1.47	1.18	1.63	1.46
<i>1,000 jobs</i>					
Employment generated by exports	735	740	320	420	697
Farm	295	296	177	119	256
Employment per billion dollars of exports	15.2	14.3	17.2	12.7	14.8
<i>1,000 jobs</i>					
Nonfarm	440	444	143	301	441
Food processing	71	70	0	70	79
Other manufacturing	59	59	19	40	55
Trade and transportation	135	135	52	83	131
Other services	175	180	72	108	176
<i>Billion dollars</i>					
Domestic equivalent of economic activity generated by competitive imports	70.6	75.4	3.3	72.1	102.6
Net business surplus of trade	45.0	51.9	37.3	14.6	13.4
Nonfarm, nonfood processing sectors:					
Net direct benefit from exports	4.6	5.2	3.8	1.4	.8
Net increased output from exports	20.9	24.6	19.4	5.2	7.8
<i>Percent</i>					
Farm share of total income from exports	24	24	35	17	22
Trade and transportation share of total income from exports	25	24	24	25	25

Source: Calculated by ERS using data from the U.S. Department of Commerce.

tance of raw food commodities in the export bill of goods. The income shares of food imports (\$6 billion less than exports) were a reversal of the export share proportions. The food processing sector received 24 percent and the farm sector generated 12 percent of all income from imports, reflecting the

greater importance of processed food products in the food imports bill of goods.

This analysis does not include additional spending that may result from the income generated by this trade, so these estimates of economywide influences of agricultural and food trade are conservative. ^{RA}



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